



User Manual

Cygnus Router Series

Contents

Contents	3
1. About this Manual	5
1.1 Contact Details	5
1.2 Copyright and Disclaimer	6
2. Introduction	7
2.1 The Cygnus Router	7
2.2 Cygnus Router Range	7
2.3 Features	8
3. Cygnus Architecture	9
3.1 Inserting and Removing Cards	11
3.2 Ventilation	11
3.2.1 The Front Fan Modules	12
3.2.2 The Rear Fan Assembly	13
3.3 Power Supply	14
3.3.1 Earthing	15
3.3.2 Mains Surge Protection	15
3.4 Power Distribution	15
3.5 Safety Warnings	15
3.6 Input Cards 5910 and 5911	16
3.6.1 Cygnus 5910 Input Module DIP Switch Settings	16
3.6.2 Cygnus 5910 Input Module LED Information	17
3.6.3 Cygnus 5911 Input Module DIP Switch Settings	17
3.6.4 Cygnus 5911 Input Module LED Information	18
3.6.5 Physical Positions of Input Cards	18
3.7 Output Card 5921	19
3.7.1 Cygnus 5921 Output Module DIP Switch Settings	20
3.7.2 Cygnus 5921 Output Module LED Information	20
3.7.3 Physical Positions of Output Cards	21
3.8 Crosspoint Card 5900	22
3.8.1 The Crosspoint Structure	23
3.8.2 Cygnus 5900 Crosspoint Module LED Information	24
3.8.3 Physical Positions of Crosspoint Cards	25
3.9 Monitoring Card 5929	26
3.9.1 Monitoring Architecture	27
3.9.2 Cygnus 5929 Monitor LED Information	28
4. Router Controllers	29
4.1 Nebula and Nucleus Controller Card Functions	29
4.2 Controller Card Location	31
4.3 Controlling Cygnus	31
4.4 Dual Redundant Controller Operation	32
4.4.1 Nebula Only	32
4.5 System Database	33
4.5.1 Nebula Fixed Database RS485 Port Configuration	33
4.5.2 Nucleus Default Database RS485 Port Configuration	33
4.6 Control Protocols	34
4.6.1 General Switcher Protocol (SW-P-02)	34
4.6.2 General Remote Control Protocol (SW-P-08)	34
4.6.3 Multi-Drop Communications Protocol (SW-P-06)	34
4.6.4 Simple Switcher Protocol (SW-P-03)	34
4.7 SNMP Terminology	35
4.8 Nebula Controller	36
4.9 Nucleus Controller	36

5. Nebula Controller	37
5.1 Control Card 1280/2448/2449/2444	37
5.1.1 Control Module Functions	37
5.2 Nebula Controller and Editor Version Numbers	38
5.3 System Diagram	38
5.4 2444 Configuration Switches	39
5.4.1 Switch Descriptions	40
5.4.2 2444 Diagnostic LEDs	41
5.5 Using the Reset Buttons	41
5.6 2448/2449 Configuration Switches	42
5.6.1 Setting Master/Slave Jumpers	42
5.6.2 Selecting Serial or Ethernet Control - 2449 Only	43
5.6.3 Selecting RS232/422 for RS485 Port 3	43
5.6.4 2448/2449 Diagnostic LEDs	43
5.7 Control and Reference Port Details	44
5.8 Connecting Reference signals	45
5.9 RS485 Multi-Drop Communications Protocol (SW-P-06)	46
5.10 Using the Ethernet Port with the Nebula Controller - 2449 Only	47
5.10.1 Connecting Cygnus to a network	47
5.10.2 Using the configuration tool	47
5.11 Installing the Windows Trap Service	52
5.11.1 Windows NT	52
5.11.2 Windows 2000/XP	52
5.12 Controlling the Router	53
6. Nucleus Controller	55
6.1 1280 Controller Card Carrier	55
6.1.1 Cygnus 1280 Control Carrier Module LED Information	55
6.2 2450 Nucleus Router Controller Card	56
6.2.1 2450 Nucleus Controller LEDs	56
6.3 Update 2450 Nucleus Software Using FTP	58
6.4 Update 2450 Nucleus Software Through Pbak Deploy	59
6.4.1 Pbak Deploy Configuration Using the Compact Flash Card	59
6.5 Updating 2450 Nucleus Firmware	60
6.5.1 Update Nucleus Firmware Using FTP	60
6.5.2 Update Nucleus Firmware Using the Compact Flash Card	60
6.6 Finding the 2450 Nucleus IP Address	60
6.7 Control and Reference Port Details	62
6.7.1 RS485 Multi-Drop Communications Protocol (SW-P-06)	63
7. Cygnus Rear View	65
7.1 Monitoring Outputs	66
7.2 Control, Reference and Alarm connections	67
7.3 Connector Pin Outs	68
7.3.1 RS232 Serial Port - Nebula Only	68
7.3.2 RS485- Serial Ports 1 to 4	68
7.3.3 AES Reference and LTC	68
7.3.4 PSU Status	68
7.3.5 Alarms	69
8. Specification	71

1. About this Manual

This manual describes the Cygnus Router, and the configuration of the various modules that can be added to it.

Refer to the Installation Manual for details on how to unpack, install and test the Cygnus Router.

Refer to the Nebula or Workbench manuals for details on configuring the router hardware and software panels.

If you have any questions regarding the installation and setup of your product, please refer to the Customer Service contact details (see section 1.1).

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2. Introduction

2.1 The Cygnus Router



Fig 1. The Cygnus Router

The Cygnus range of routers is designed for the next evolution in HD TV; 1080 progressive. This means designing equipment that can support twice the data rate of standard HD equipment. Snell's Cygnus Router was specifically designed to handle 1.5GB/s and 3GB/s, and does this cost effectively and without compromise.

2.2 Cygnus Router Range

The Cygnus family consists of two different frame configurations:

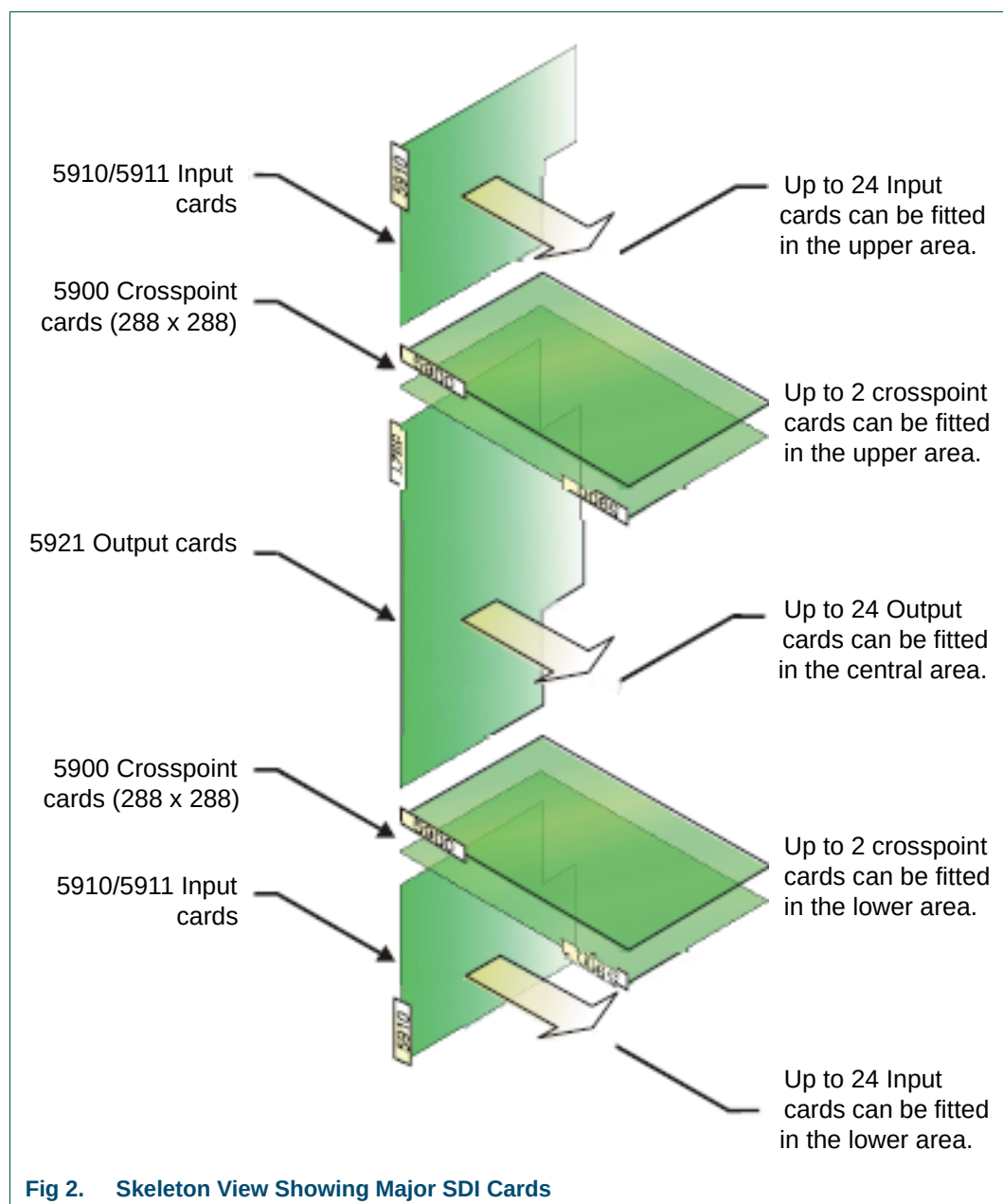
- 576 x 576 in 26U (including redundant PSUs)
- 288 x 576 in 21U (including redundant PSUs)

2.3 Features

- Specifically designed for 1.5Gbit/s HD and 3Gbit/s 1080p
- Dual redundant PSU
- Dual redundant controllers
- 3Gb/s capable cards route 3G, 1.5G, HD-SDI, SDI and ASI
- Built-in Nebula or Nucleus control system
- Dual Ethernet (one per controller)
- 4 x RS485 ports available with Nucleus controller, 2 x RS 485 ports available with Nebula controller, configurable as remote or panel ports
- Monitoring and alarms of PSUs, fans, controllers, all signal cards
- **Video Reference Inputs:**
 - Nebula Router Controller - Three video reference inputs (all black and burst or HD tri-level) – allows multi standard switching in accordance with SMPTE RP168
 - Nucleus Router Controller - Four video reference inputs (configurable) – allows multi standard switching in accordance with SMPTE RP168
- Nucleus Router Controller - Provides SNMP V2 status information
- Timecode input for pre-loaded timed switching
- Monitoring outputs – 4 for Input and Output monitoring (currently only 1 supported)

3. Cygnus Architecture

The Cygnus architecture allows the router to be configured in any combination of 12-channel input and 24-channel output blocks, up to 576 x 576 in a single 24U frame.

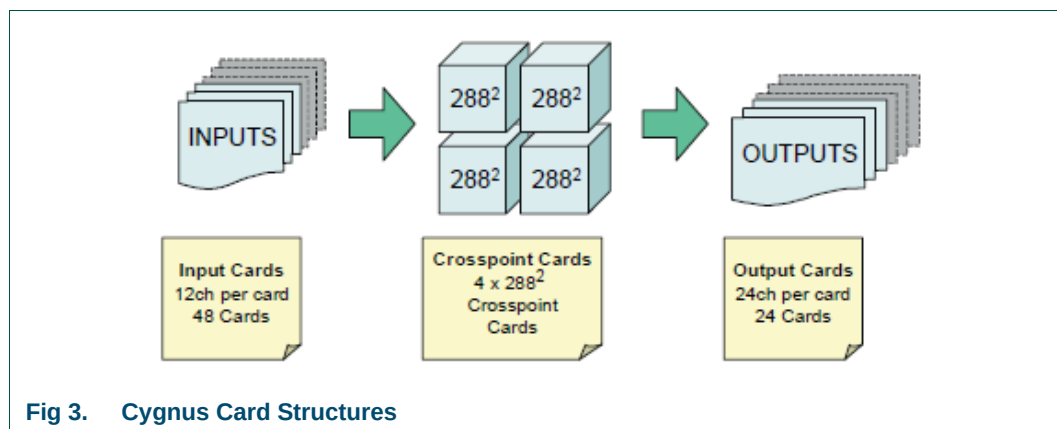


The Cygnus router uses Snell's classic three-card architecture:

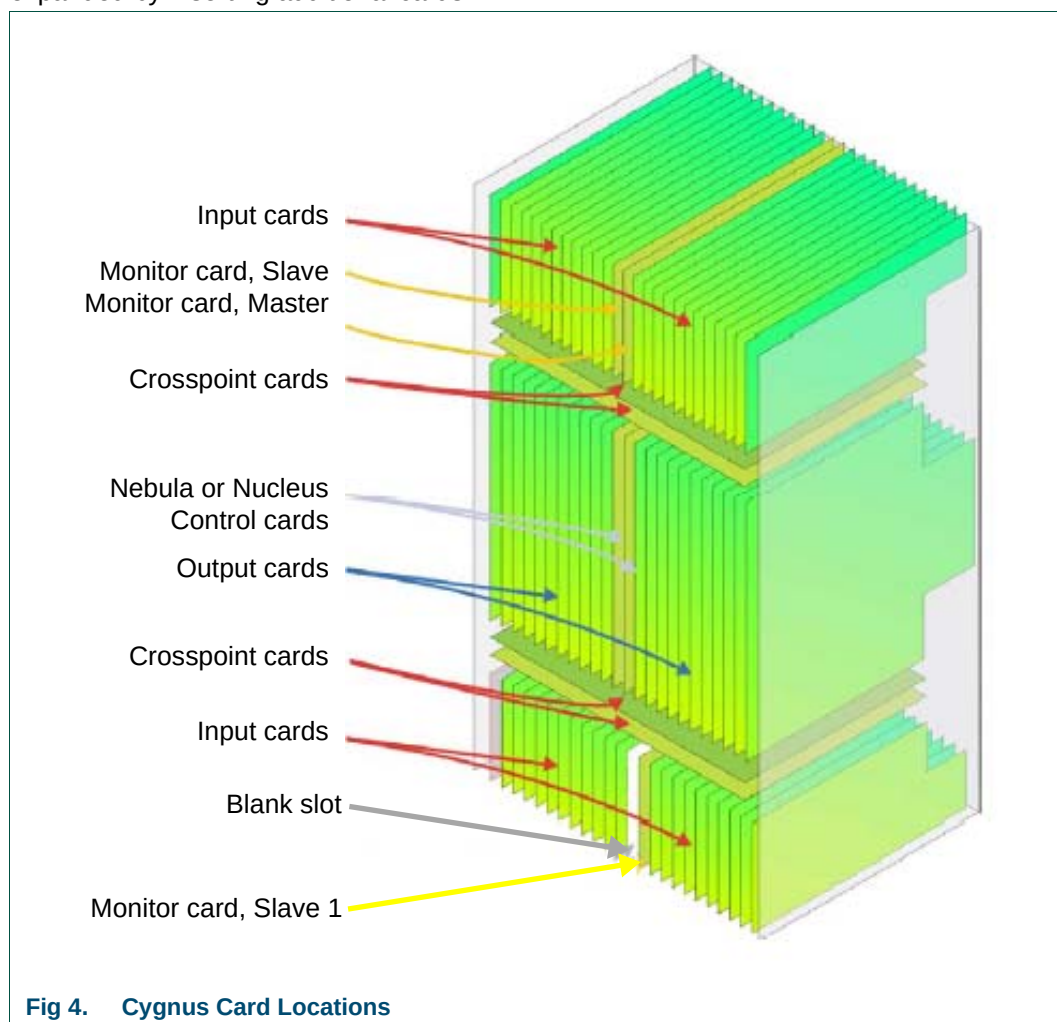
- Input Card
- Output Card
- Crosspoint card

Cygnus also has:

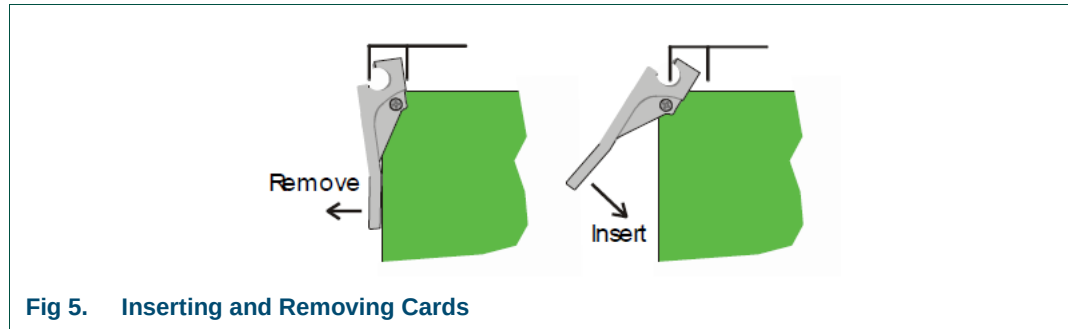
- Monitor card
- Control card



A fully populated Cygnus frame can have up to 576 inputs and 576 outputs. Each input card has 12 inputs and a fully populated frame has 48 cards. Each output card has 24 outputs, and a fully populated frame has 24 cards. There are 4 crosspoint cards. There are also 3 slots for monitoring cards and 2 slots for control cards. All cards hot swappable. The system can be expanded by inserting additional cards.



3.1 Inserting and Removing Cards



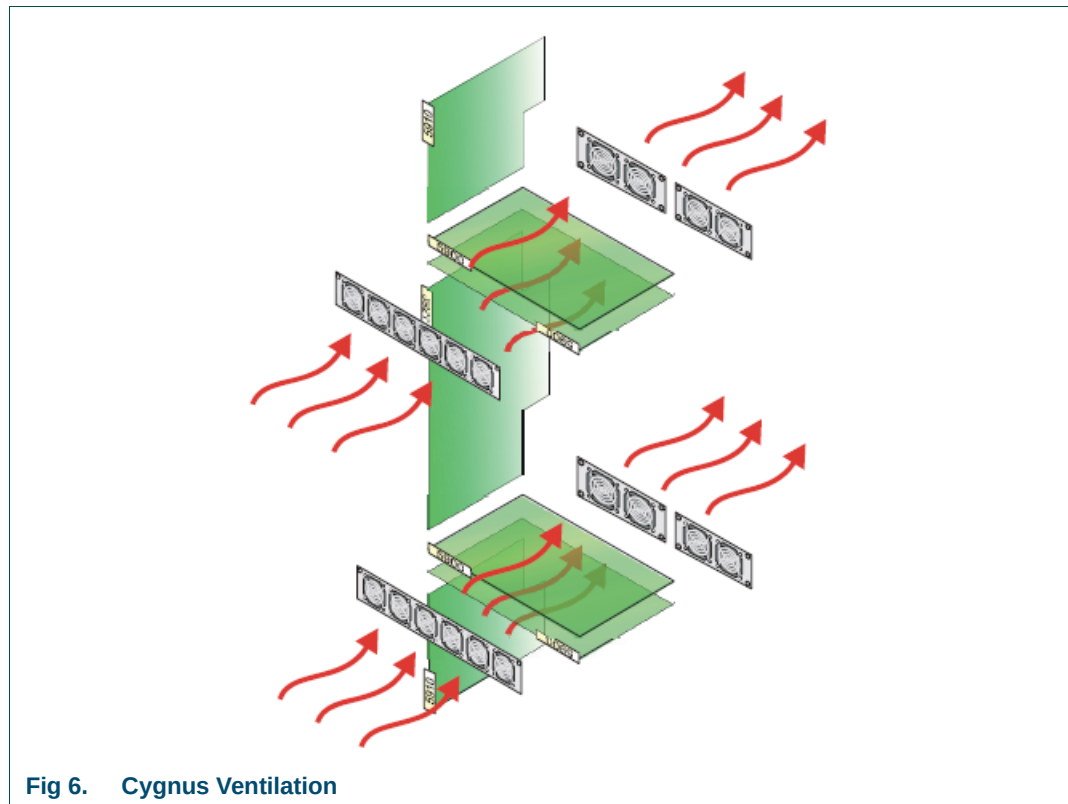
As can be seen by the above sectional drawing (Figure 5), all card handles locate into the metalwork of the Cygnus frame in such a way that allows easy insertion and removal. Pulling the bottom of the handle outwards will lever the card out of its socket for removal. When inserting the module, the handle must be lifted and located in the frame as shown, before using the handle to push the card fully home. Static precautions must be observed when inserting and removing all system modules.



Electrostatic Damage

Static precautions must be observed when inserting and removing all system modules

3.2 Ventilation

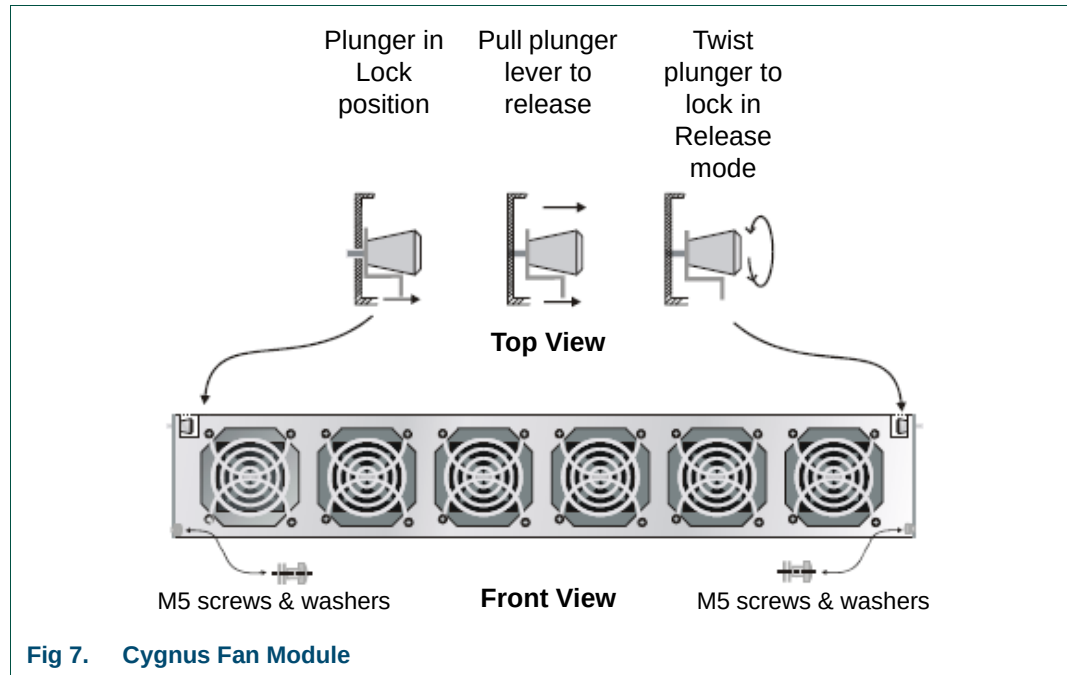


The main frame is ventilated by two fan modules mounted in front of the crosspoint modules and expelled by two rear fan modules. Air is sucked in through the ventilation slots in the front door and circulated through the frame, finally being expelled by the rear fans. The power supplies have their own integral cooling system. All the fan modules are monitored for failure.



Ensure the flow of air through the vents is not restricted

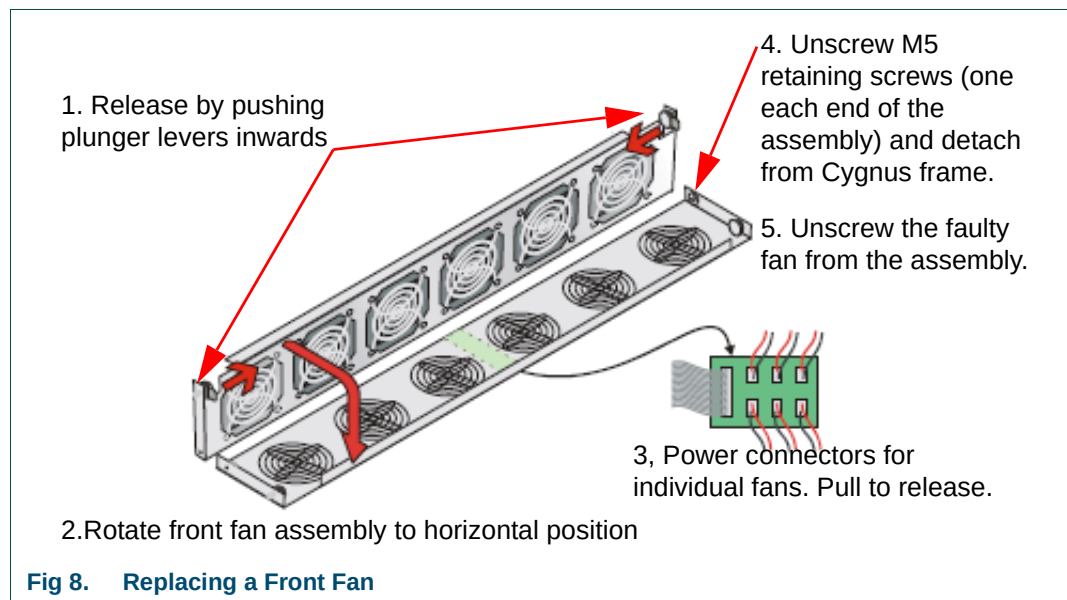
3.2.1 The Front Fan Modules



The fan module assembly comprises six fans. The fan module can be swung into the service position by releasing the two top plungers and rotating the assembly (see Figure 8). This allows access to the crosspoint cards. If however you are replacing a faulty fan, then it is easier and safer to remove the whole fan assembly from the Cygnus frame.

3.2.1.1 Replacing a Front Fan Module

The fans are very reliable, however in the event of a failure, the individual fans can be easily replaced. The fans are low voltage and may be safely hot plugged



To replace a fan (refer to Figure 8):

1. Release the top two side plungers. Push spring loaded plunger levers to release the top of assembly (Figure 9 shows the mechanism in detail).
2. Rotate the fan assembly into the horizontal service position.
3. Unplug fan power connector.

4. Unscrew the two bottom side screws (M5 screw and two washers) – complete fan assembly will detach from the Cygnus frame.
5. Unscrew faulty fan from main assembly.
6. Fit new fan and screw into position.
7. Re-attach fan assembly to Cygnus frame
8. Re-connect the fan power connector.
9. Fasten the two side screws and washers (do not overtighten)
10. Rotate assembly back into normal position. Ensure plungers are secure.

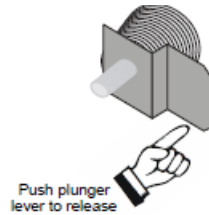


Fig 9. Front Fan Assembly Plunger Detail

3.2.2 The Rear Fan Assembly

There are four rear fan assemblies; two in the upper frame and two in the lower frame (see Figure 12). Each unit has two 12Volt fans. The fans are monitored and will trigger a failure alarm if they fail or are impeded in any way. The fans have been designed for easy maintenance and are straightforward to replace.

3.2.2.1 Replacing a rear fan

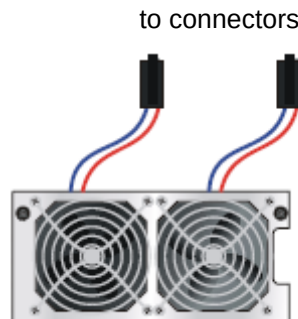


Fig 10. Rear Fan Assembly

1. The rear fan assembly may be removed from the Cygnus frame by undoing the four captive thumb screws.
2. Disconnect the fan power connector. There is no need to de-solder the power leads because the replacement fans are supplied with factory fitted leads and connectors.
3. Unscrew the four corner screws to remove the faulty fan and
4. Fit replacement.

Take care to avoid sharp metal edges.



When the fan unit is disassembled, the fan blades are exposed, so care should be taken to keep fingers clear whilst the fans are rotating.

3.3 Power Supply

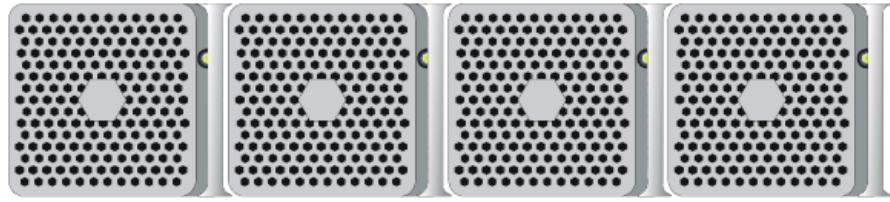


Fig 11. Front View of Cygnus Power Supply

The power supply is a separate 2U assembly; usually located directly above the router. Snell provide two connecting cables for passing the 48 Vdc to the main chassis. If the user needs to locate the power supply further away, longer cables will be required.

The power supply assembly holds up to four individual Power Supply Units (PSUs). The router requires a minimum of two power supplies to function. For full redundancy, four power supplies must be fitted. The power supply is hot bus pluggable. The four power supply units have active current share and independent IEC AC input sockets. The power supply packs are self-contained units and do not contain any serviceable items. The DC power leads connecting the power supply and the routers are low voltage, but high current – be careful not to short-circuit the terminals. Always power-down during maintenance and replace the transparent cover after use.

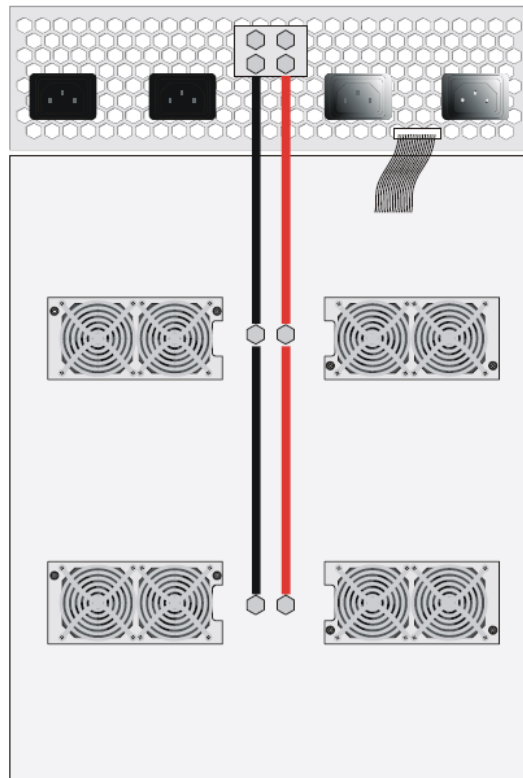


Fig 12. Rear View Showing 48 Vdc Power Distribution

3.3.1 Earthing

The 48 Vdc supply from the PSUs will float relative to the router earth if the PSU and router earths are not connected together. It is therefore essential that the PSU functional earth is connected to the router frame protective earth and that the router frame protective earth is connected directly to the main earth of the router bay.

Important:

Issues with poor signal performance, as well as EMC problems, can result from inadequate earthing.

PSU Functional Earth

A functional earth stud is available on the rear of the PSU, adjacent to the 48 Vdc output terminals. This must be connected using a substantial cable as directly as possible to the router frame protective earth.

Router Protective Earth

Threaded inserts are fitted on both side panels at the rear of the router frame, near the top and bottom. These should be connected by substantial cables as directly as possible to the bay in which the frame is situated. It is assumed that the bay itself will be properly earthed. Locking washers that bite into the metalwork should be used to ensure a good connection.

3.3.2 Mains Surge Protection

The quality of the mains power in outside broadcast vehicles is unpredictable. In such applications, it is a sensible precaution to use some form of surge protection. If this is not incorporated in the vehicle then portable devices are readily available from popular component distributors. One such device is the Tyco/Bowthorpe DSP1, which is rated to suppress a peak surge current of 30 kA. Such devices can be wired into the mains distribution (using short connections), or fitted with a short power lead and plugged into a mains socket near to the router.

3.4 Power Distribution

The power supplies provide 48 Vdc for distribution to the entire frame. All cards have on-board DC to DC converters to locally supply the required voltages, as indicated by LEDs on the front edge of each card. This arrangement provides simple power distribution, as well as effective power de-coupling between modules.

The 12 Vdc power to all fan modules is provided by DC to DC converters located on the Control Cards. Only one control card is required for this purpose, but with no control cards fitted, the fans will not function. This will cause the system to quickly overheat.

Important:

Do not run the router without at least one 1280 Control Card.

3.5 Safety Warnings



- The power packs contain dangerous high voltages and should only be serviced by suitably qualified persons
- This equipment has more than one power supply cord. To reduce the risk of electrical shock, disconnect all the power supply cords before servicing.
- The DC leads connecting the power supply to the router are capable of supplying very high electric current. Do not short circuit.

3.6 Input Cards 5910 and 5911

There are two types of SDI input cards:-

- 5910 Non-Clocking Input card.
- 5911 Re-Clocking Input card.

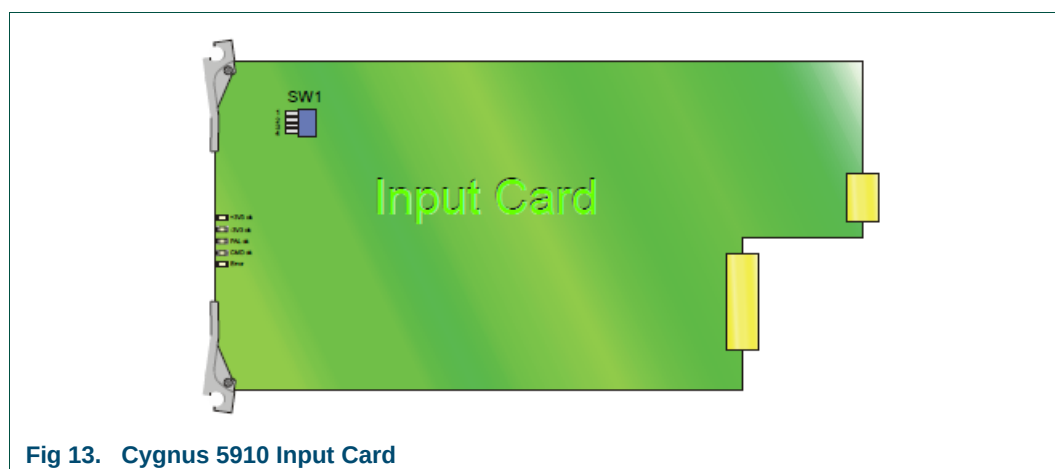


Fig 13. Cygnus 5910 Input Card

The 591X Input cards are exclusively designed for the Cygnus router. They have 12 input channels, and each channel can handle signals up to 3Gb/s. The cards feature auto-equalisation and no user controls or adjustments are necessary.

Up to 24 cards may be fitted in the upper section and up to 24 in the lower section. The cards in the lower section of the frame are mounted upside down.

If input monitoring is required then 5929 monitoring cards must be fitted to the router (see section 3.9.1 for details).

The 5911 is the Re-Clocking version of the 5910 and may be required if signal quality is poor or high levels of jitter are present.

3.6.1 Cygnus 5910 Input Module DIP Switch Settings

Switch: SW1

Note: SW1 is a DIP switch containing 4 independent switches.

DIP Switch	Switch	Position	Action
SW1	1	Off	Normal Operation "CMD OK" LED only flashes when module is addressed & CRC is correct
		On	Debug Operation "CMD OK" LED illuminates when any CRC is correct (allows for debugging of LVDS bus)
SW1	2	Off	No Operation
		On	No Operation
SW1	3	Off	No Operation
		On	No Operation
SW1	4	Off	No Operation
		On	No Operation

Table 1. 5910 DIP Switch SW1 Settings

3.6.2 Cygnus 5910 Input Module LED Information

The LED color shown in bold text is the normal operating condition (if any).

LED	Illuminated Color	Detail
+3V3 OK	Green	The +3V3 supply is working correctly
	Off	The +3V3 supply has failed
-3V3 OK	Green	The -3V3 supply is working correctly
	Off	The -3V3 supply has failed
PAL OK	Yellow	The PAL is operational
	Off	The PAL has failed
CMD OK	Yellow	Correct command received from controller (behavior can be adjusted according to the DIP switch settings, see Table 1.)
	Off	No correct command received from the controller
ERROR	Red	Messages with failed CRCs received from controller
	Off	Messages with correct CRCs received from controller

Table 2. 5910 LED Details

3.6.3 Cygnus 5911 Input Module DIP Switch Settings

Switch: SW1

Note: SW1 is a DIP switch containing 4 independent switches.

DIP Switch	Switch	Position	Action
SW1	1	Off	Normal Operation "CMD OK" LED only flashes when module is addressed & CRC is correct
		On	Debug Operation "CMD OK" LED illuminates when any CRC is correct (allows for debugging of LVDS bus)
SW1	2	Off	No Operation
		On	No Operation
SW1	3	Off	No Operation
		On	No Operation
SW1	4	Off	Re-clocker Bypass Off [Normal operation – will always try to re-clock signal]
		On	Re-clocker Bypass On [Re-clocker will always bypass signal]

Table 3. 5911 DIP Switch SW1 Settings

3.6.4 Cygnus 5911 Input Module LED Information

The LED color shown in bold text is the normal operating condition (if any).

LED	Illuminated Color	Detail
+3V3 OK	Green	The +3V3 supply is working correctly
	Off	The +3V3 supply has failed
-3V3 OK	Green	The -3V3 supply is working correctly
	Off	The -3V3 supply has failed
PAL OK	Yellow	The PAL is operational
	Off	The PAL has failed
CMD OK	Yellow	Correct command received from controller (behavior can be adjusted according to the DIP switch settings, see Table 3.)
	Off	No correct command received from the controller
ERROR	Red	Messages with failed CRCs received from controller
	Off	Messages with correct CRCs received from controller

Table 4. 5911 LED Details

3.6.5 Physical Positions of Input Cards

Inputs 1 - 12
Inputs 145 - 156
Inputs 13 - 24
Inputs 157 - 168
Inputs 25 - 36
Inputs 169 - 180
Inputs 37 - 48
Inputs 181 - 192
Inputs 49 - 60
Inputs 193 - 204
Inputs 61 - 72
Inputs 205 - 216
Slave Monitor Card
Master Monitor Card
Input 73 - 84
Inputs 217 - 228
Inputs 85 - 96
Inputs 229 - 240
Input 97 - 108
Inputs 241 - 252
Inputs 109 - 120
Inputs 253 - 264
Inputs 121 - 132
Inputs 265 - 276
Inputs 133 - 144
Inputs 277 - 288

Fig 14. Input Card Physical Positions (Top Frame)

Inputs 565 - 576
Inputs 421 - 432
Inputs 553 - 564
Inputs 409 - 420
Inputs 541 - 552
Inputs 397 - 408
Inputs 529 - 540
Input 385 - 396
Inputs 517 - 528
Inputs 373 - 384
Inputs 505 - 516
Input 361 - 372
Blank Slot
Slave Monitor Card
Inputs 493 - 504
Inputs 349 - 360
Inputs 481 - 492
Inputs 337 - 348
Inputs 469 - 480
Inputs 325 - 336
Inputs 457 - 468
Inputs 313 - 324
Inputs 445 - 456
Inputs 301 - 312
Inputs 433 - 444
Inputs 289 - 300

Fig 15. Input Card Physical Positions (Bottom Frame) (576 Output Frames Only)

3.7 Output Card 5921

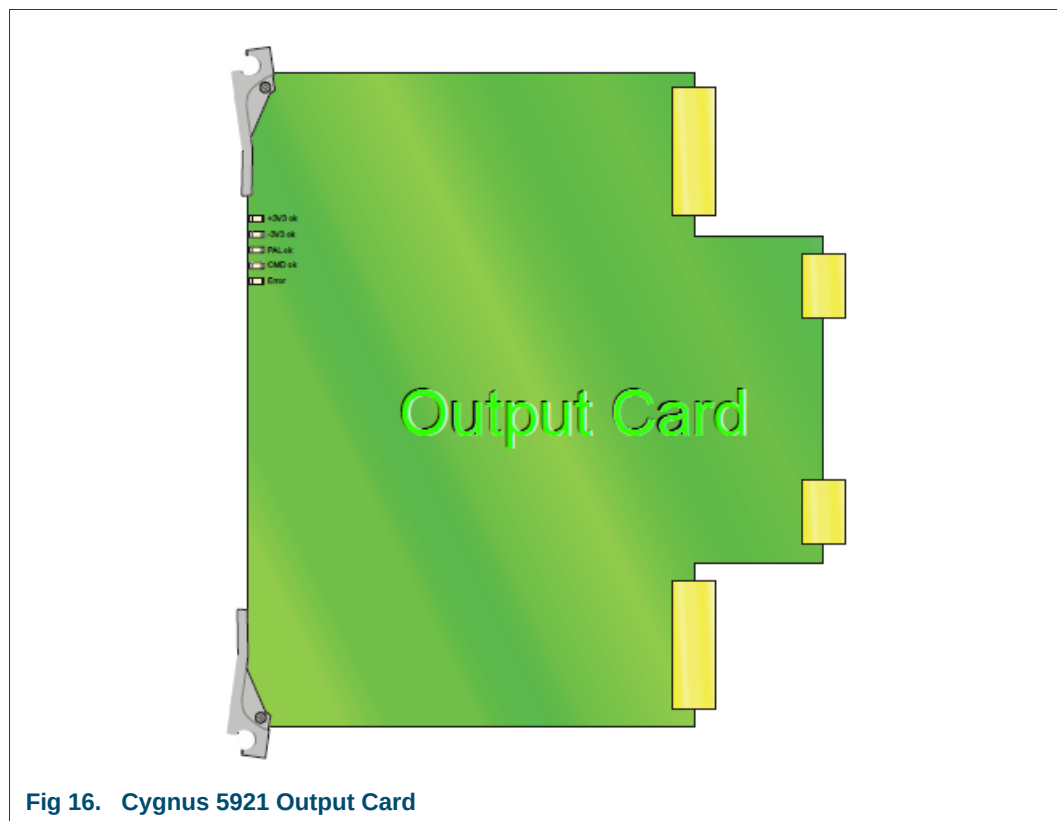


Fig 16. Cygnus 5921 Output Card

The 5921 Output card is exclusively designed for the Cygnus router. It has 24 output channels, and each channel can handle signals up to 3Gb/s. The card will detect and re-clock all standard digital video signals, including:

- 270Mb/s, 1.485Gb/s and 3Gb/s

The card is fully automatic and no user controls or adjustments are necessary.

If output monitoring is required then a 5929 monitoring card must be fitted to the router (see section 3.9.1 for details).

The output card is large and care should be taken when handling and fitting. Up to 24 cards can be fitted in the middle section of the router.

3.7.1 Cygnus 5921 Output Module DIP Switch Settings

Switch: SW1

Note: SW1 is a DIP switch containing 4 independent switches.

DIP Switch	Switch	Position	Action
SW1	1	Off	Normal Operation "CMD OK" LED only flashes when module is addressed & CRC is correct
		On	Debug Operation "CMD OK" LED illuminates when any CRC is correct (allows for debugging of LVDS bus)
SW1	2	Off	No Operation
		On	No Operation
SW1	3	Off	No Operation
		On	No Operation
SW1	4	Off	Re-clocker Bypass Off [Normal operation – will always try to re-clock signal]
		On	Re-clocker Bypass On [Re-clocker will always bypass signal]

Table 5. 5921 DIP Switch SW1 Settings

3.7.2 Cygnus 5921 Output Module LED Information

The LED color shown in bold text is the normal operating condition (if any).

LED	Illuminated Color	Detail
+3V3 OK	Green	The +3V3 supply is working correctly
	Off	The +3V3 supply has failed
-3V3 OK	Green	The -3V3 supply is working correctly
	Off	The -3V3 supply has failed
PAL OK	Yellow	The PAL is operational
	Off	The PAL has failed
CMD OK	Yellow	Correct command received from controller (behavior can be adjusted according to the DIP switch settings, see Table 5.)
	Off	No correct command received from the controller
ERROR	Red	Messages with failed CRCs received from controller
	Off	Messages with correct CRCs received from controller

Table 6. 5921 LED Details

3.7.3 Physical Positions of Output Cards

Outputs 1 - 24
Outputs 289 - 312
Outputs 25 - 48
Output 313 - 336
Outputs 49 - 72
Outputs 337 - 360
Outputs 73 - 96
Output 361 - 384
Outputs 97 - 120
Outputs 385 - 408
Outputs 121 - 144
Outputs 409 - 432
Control Card 1
Control Card 2
Outputs 145 - 168
Outputs 433 - 456
Outputs 169 - 192
Outputs 457 - 480
Outputs 193 - 216
Outputs 481 - 504
Outputs 217 - 240
Outputs 505 - 528
Outputs 241 - 264
Outputs 529 - 552
Outputs 265 - 288
Outputs 553 - 576

Fig 17. Physical Positions of Output and Control Cards (Mid Frame)

3.8 Crosspoint Card 5900

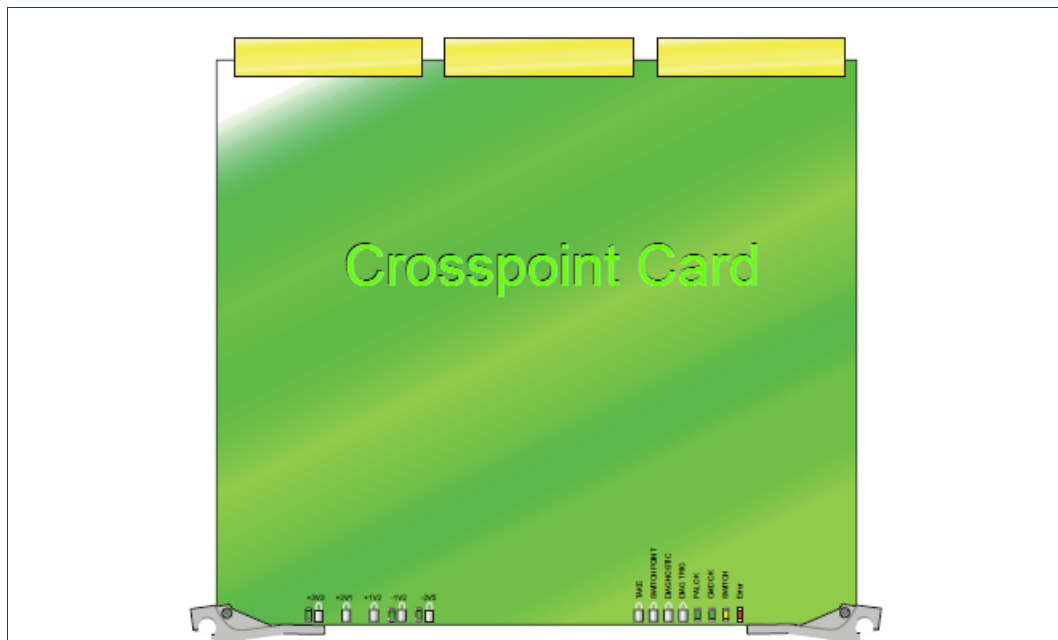


Fig 18. Cygnus 5900 Crosspoint Card

The 5900 Crosspoint card is exclusively designed for the Cygnus router. Each crosspoint card is 288 x 288. A fully populated 576 x 576 frame has four crosspoint cards and a fully populated 288 x 576 frame has two crosspoint cards.

The cards are mounted in pairs behind the front fan units. To gain access to the crosspoint cards, release the two fan unit retaining plungers and rotate the fan units clear.

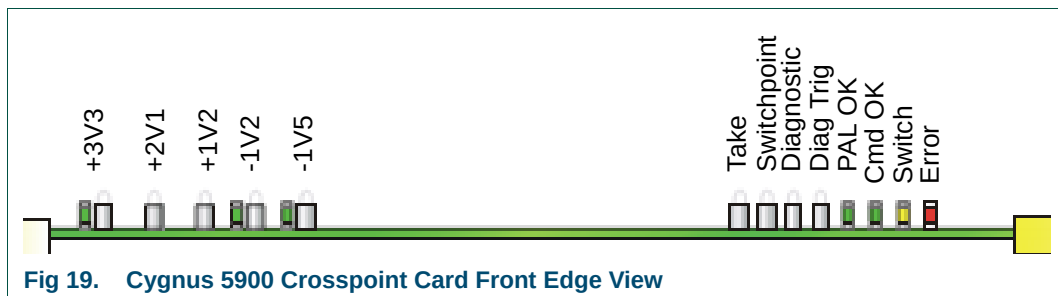


Fig 19. Cygnus 5900 Crosspoint Card Front Edge View

The crosspoint cards have all their test points and diagnostic LEDs, mounted on the front edge for easy access. When fitting crosspoint cards please note that the second card is mounted upside down (Figure 20).

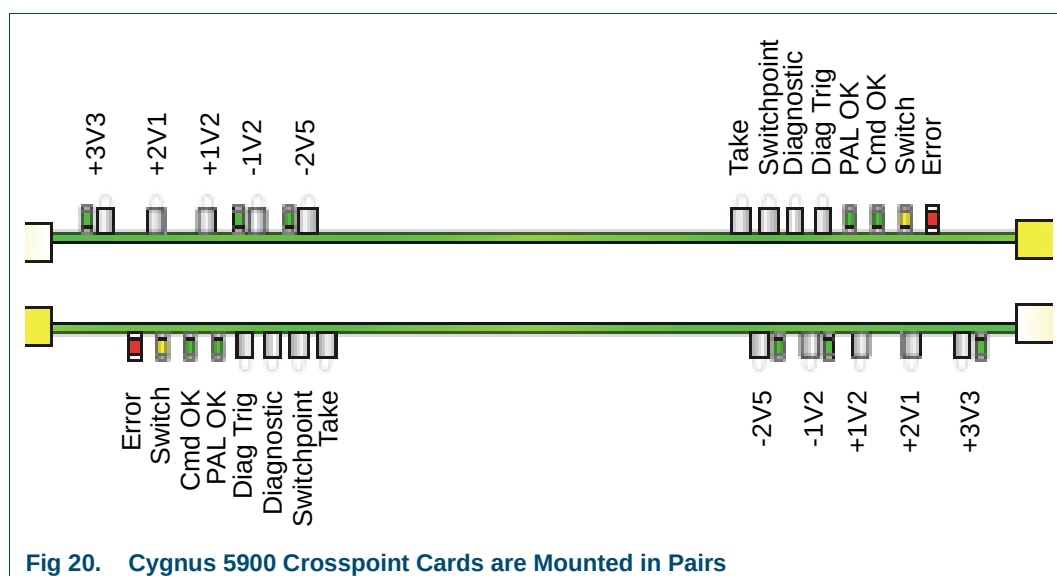


Fig 20. Cygnus 5900 Crosspoint Cards are Mounted in Pairs

3.8.1 The Crosspoint Structure

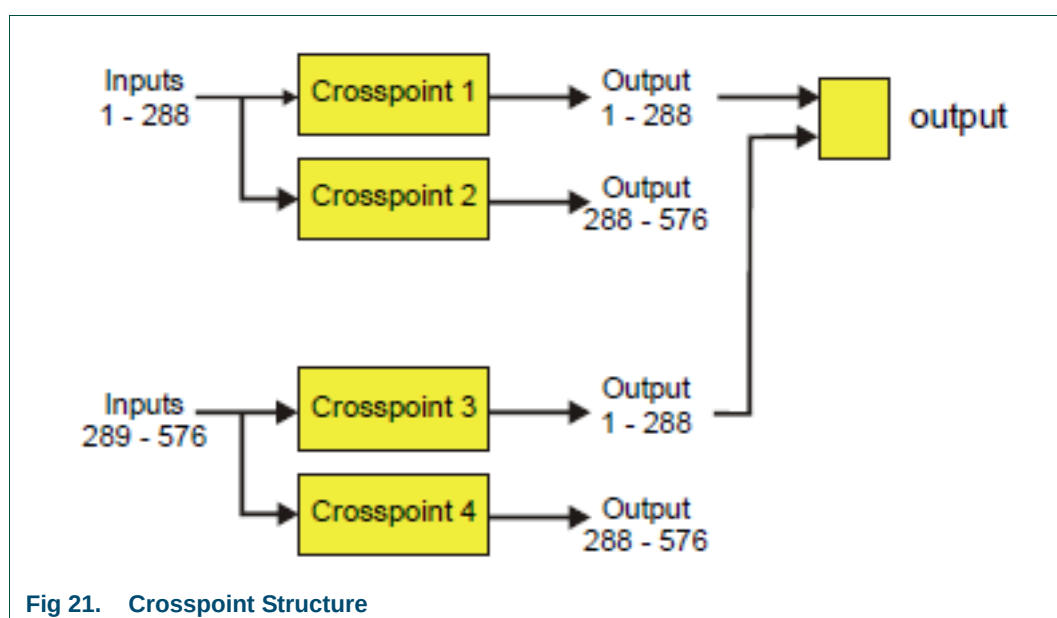


Fig 21. Crosspoint Structure

The Cygnus crosspoint structure is shown in Figure 21. The two upper crosspoint cards connect to the first 288 sources, and the two lower crosspoints connect to the last 288 sources. Each Output card therefore must include a two-by-one switch, for each output, to select its feed from the upper or lower or pair of crosspoints.

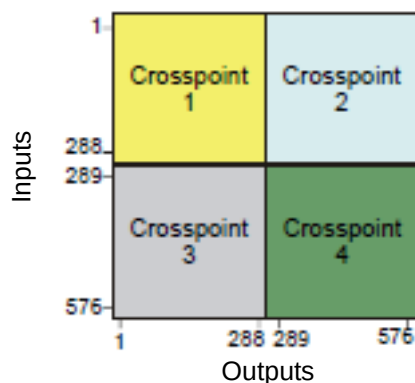


Fig 22. Choosing the Number of Crosspoints

The number of crosspoints that are required will vary depending on how the frame is populated. In practice you will be likely to be fitting, either 1, 2, or 4 crosspoints. If you have a fully populated 576 x 576 frame, you will require all four crosspoint cards. If, for example, you are only using inputs and outputs 1-288, then you will require only crosspoint 1. Figure 22 illustrates the principle.

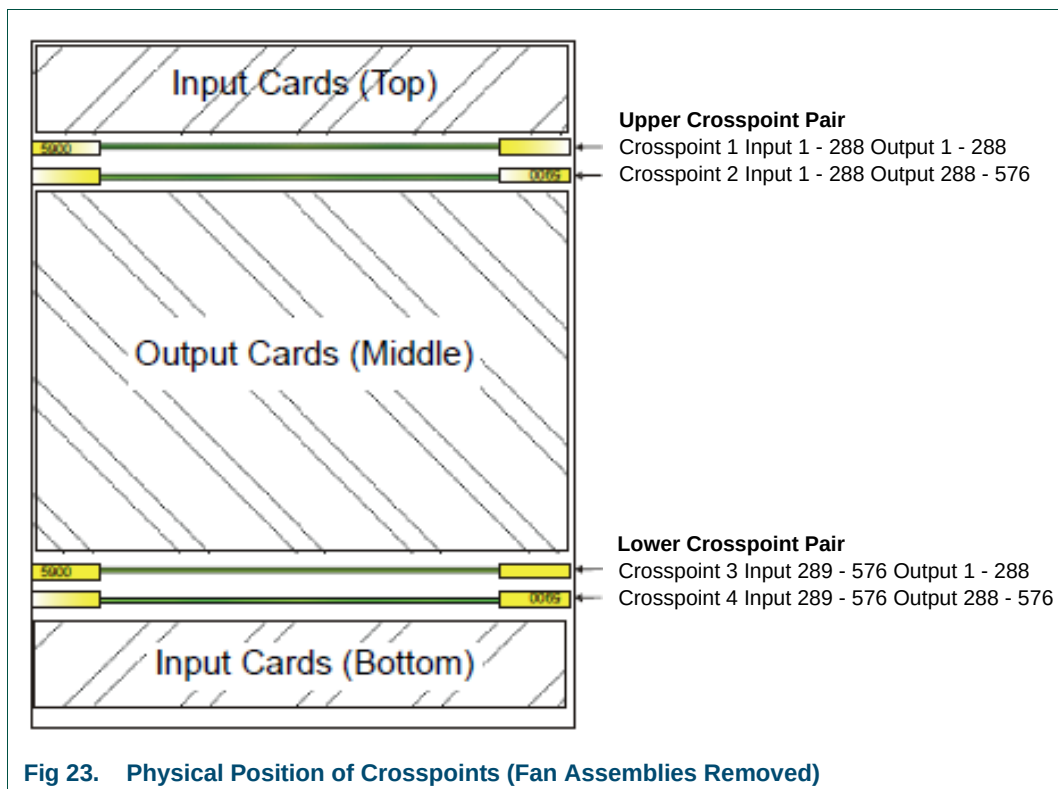
3.8.2 Cygnus 5900 Crosspoint Module LED Information

The LED color shown in bold text is the normal operating condition (if any).

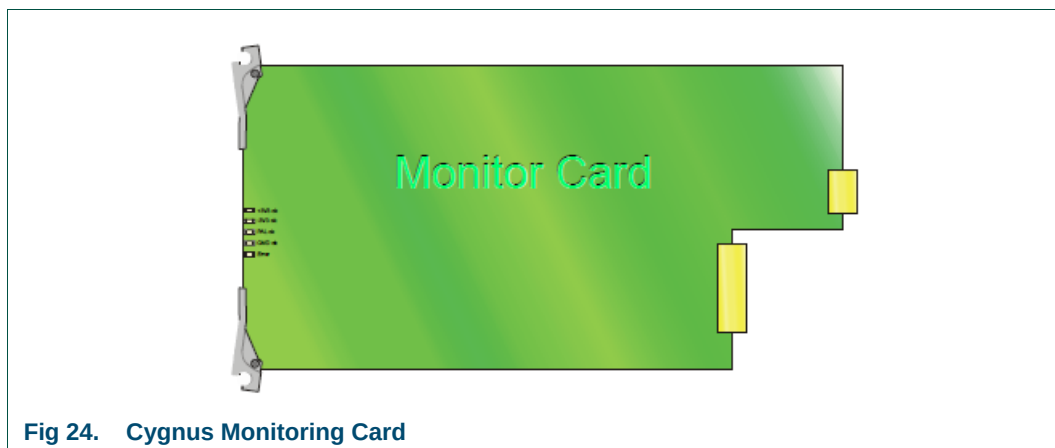
LED	Illuminated Color	Detail
+3V3 OK	Green	The +3V3 supply is working correctly
	Off	The +3V3 supply has failed
-1V2 OK	Green	The -1V2 supply is working correctly
	Off	The -1V2 supply has failed
-2V5 OK	Green	The -2V5 supply is working correctly
	Off	The -2V5 supply has failed
PAL OK	Green	Flashing off then green at 1 Hz - The PAL is operational
	Off	The PAL has failed
CMD OK	Green	Flashing off then green at 1 Hz - Correct command to this crosspoint has been received from the controller
	Off	No correct command received from the controller
SWITCH	Yellow	Flashing off then yellow at ~1Hz – Executing a crosspoint switch. (Take signal has been received from controller)
	Off	No correct command received from the controller
ERROR	Red	Flashing off then red at ~1Hz - Messages with failed CRCs received from controller or Writing to crosspoint has failed
	Off	Messages with correct CRCs received from controller

Table 7. 5900 Crosspoint Card LEDs

3.8.3 Physical Positions of Crosspoint Cards

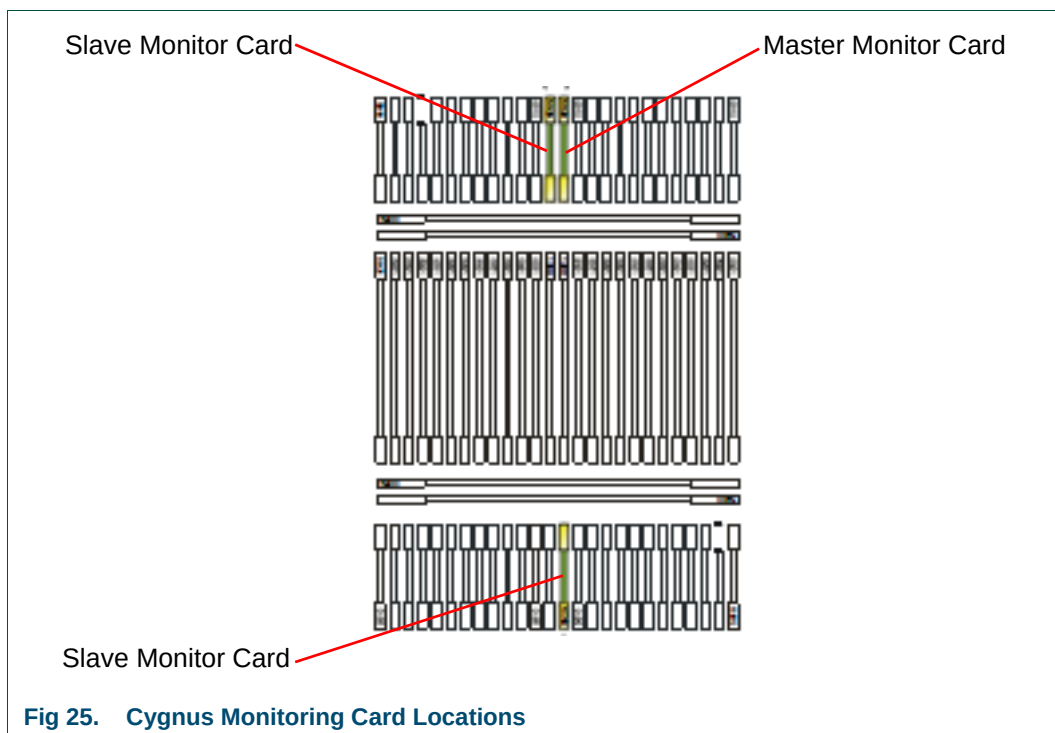


3.9 Monitoring Card 5929

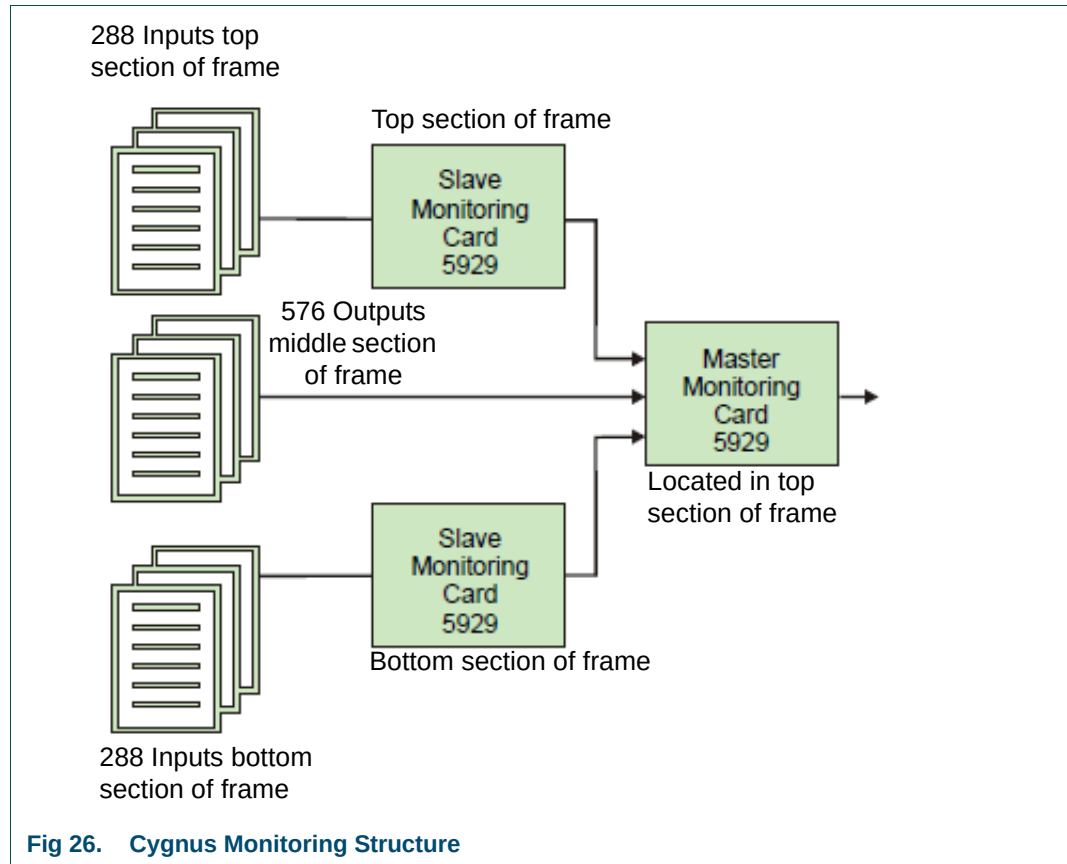


Cygnus uses a comprehensive and sophisticated system of monitoring. The structure is modular allowing different levels of implementation. For example if only output monitoring is required then only one 5929 card would be fitted.

Cygnus may have up to three cards fitted; two in the top section, and one in the bottom section (see Figure 25). The Monitoring card in the bottom section is mounted upside down.



3.9.1 Monitoring Architecture



As can be seen from Figure 26, the inputs from the top section of the frame are fed into a 5929 Slave Monitoring Card. This monitors all 24 Input cards in the top frame. Each Input card has 12 Channels, so the top monitoring card, monitors 288 inputs. The slave monitoring card in the bottom section performs a similar function, monitoring the 288 inputs from the bottom Input Cards. Both monitoring cards in turn feed the Master Monitoring Card, which acts as a gatherer of all the feeds. The master card also monitors all the output cards. If all three cards are fitted Cygnus will be capable of simultaneous input and output monitoring. If only the master card is fitted, then only output monitoring will be available.

3.9.2 Cygnus 5929 Monitor LED Information

The LED color shown in bold text is the normal operating condition (if any).

Monitor LEDs	Illuminated Color	Detail
Power OK	Green	All the power supplies are working correctly
	Off	One or more of the power supplies has failed
PAL OK	Yellow	The PAL is operational
	Off	The PAL has failed
CMD OK	Yellow/Pulse	A correct command received from controller
	Off	No correct command received from the controller
ERROR	Red	Messages with failed CRCs received from controller
	Off	Messages with correct CRCs received from controller

Table 8. Cygnus 5929 Monitor LEDs

Monitor LEDs	Illuminated Color	Detail
Port 1	Off	A source has not been selected for this port
	Red	A source has been selected but no valid signal is present
	Blue	A valid HD or 3G signal is present on this port
	Green	A valid SD signal is present on this port
Port 2	Off	A source has not been selected for this port
	Red	A source has been selected but no valid signal is present
	Blue	A valid HD or 3G signal is present on this port
	Green	A valid SD signal is present on this port
Port 3	Off	A source has not been selected for this port
	Red	A source has been selected but no valid signal is present
	Blue	A valid HD or 3G signal is present on this port
	Green	A valid SD signal is present on this port
Port 4	Off	A source has not been selected for this port
	Red	A source has been selected but no valid signal is present
	Blue	A valid HD or 3G signal is present on this port
	Green	A valid SD signal is present on this port
Scanner (Not currently operational)	Off	A source has not been selected for this port
	Red	A source has been selected but no valid signal is present
	Blue	A valid HD or 3G signal is present on this port
	Green	A valid SD signal is present on this port
Signal Generator (Not currently operational)	Off	The signal generator is off
	Red	The signal generator is not locked to the selected reference
	Blue	A valid HD or 3G signal is being generated

Table 9. Cygnus 5929 Monitor LEDs

4. Router Controllers

The router controllers are real-time router control cards which perform the following functions:

- Interface to all the external devices (control system, panels and so on), through serial port connections and Ethernet (Ethernet not supported on 2448 card).
- Store the local configuration of the router.
- Contain all circuitry to manage multiple reference inputs.
- Set video crosspoints in response to external commands and respond with tally information
- Monitor the status of the system components and report this to the external systems as supported by the associated router controller MIB file (see Table 10.)

The Cygnus router is compatible with both the Nebula and Nucleus router controllers. For full redundancy, two router control cards can be fitted into a Cygnus router.

Note: When two router controllers are fitted in the router they must both be the same type. For example: either 2 x Nebula or 2 x Nucleus controllers should be fitted.

The router control cards will then function in 'auto-failover' mode in the event of a processor failure, or card removal. See section 4.4 for full details of dual redundant controller operation.

4.1 Nebula and Nucleus Controller Card Functions

Function	Nebula	Nucleus
Controller Configuration	Nebula Editor via RS232 serial link connection to PC	Workbench via Ethernet connection to PC
Status Reporting	PSU and Controllers via SNMP Agent	Comprehensive router status displayed on Workbench PC screens
Router Database Updates	Push the database to the active controller. The active controller will automatically push the database to the idle controller	Push the database to each controller in turn. Both controllers must have the same database
Mapping	Level mapping only no logical mapping	Logical to physical source and destination mapping. Source and destinations addressed by external controllers can be mapped to different physical sources and destinations in the frame
Levels	8 levels in a single matrix	4 levels in a single matrix
Expansion and source/destination numbering	Sources and destinations for one level must all be in a block sequentially numbered	Sources and destinations for one level do not need to be in a block and don not need to be sequentially numbered
Ports	2 x RS485 serial ports 2 x RS232 editor port (1 per controller) 3 x fixed video reference ports (525, 625 and Tri-level) 2 x Ethernet ports if Beck chip fitted (1 per controller) 10 Base-T only	4 x RS485 serial ports 4 x multi-standard video reference ports 2 x Ethernet ports (1 per controller) 10 Base-T only

Table 10. Nebula and Nucleus Controller Card Functions

Function	Nebula	Nucleus
Supported Protocols		
SNMP Control	Yes via RS485 port, usually port 2	Yes from version 1.1.7
SNMP Monitoring	Yes via RS485 port, usually port 2	Yes from version 1.1.7
Web	Web control, no monitoring. SW-P-02 over IP and SNMP only	No
SW-P-02 on RS485 ports in RS422 mode	Yes - as a controlled device only	Yes - as a controlled device or as a controller
SW-P-02 over IP	Yes - as a controlled device only via an RS485 port, usually port 2	Yes - as a controlled device or as a controller
SW-P-08 on RS485 ports in RS422 mode	Yes - as a controlled device only	Yes - as a controlled device or as a controller from version 1.1.7
Tandberg General Switcher IN	Yes - as a controlled device only over RS485 (usually port 2) or IP	No
Barco Rosa IN	Yes - as a controlled device only	Yes - as a controlled device only from version 1.1.11
Sandar Prosan IN	Yes - as a controlled device only over RS485 (usually port 2)	No
GVG IN	No	Yes - ES-Control as a controlled device only from version 1.1.8
Leitch Harris Passthrough IN	No	Yes - as a controlled device only from version 1.1.7

Table 10. Nebula and Nucleus Controller Card Functions

4.2 Controller Card Location

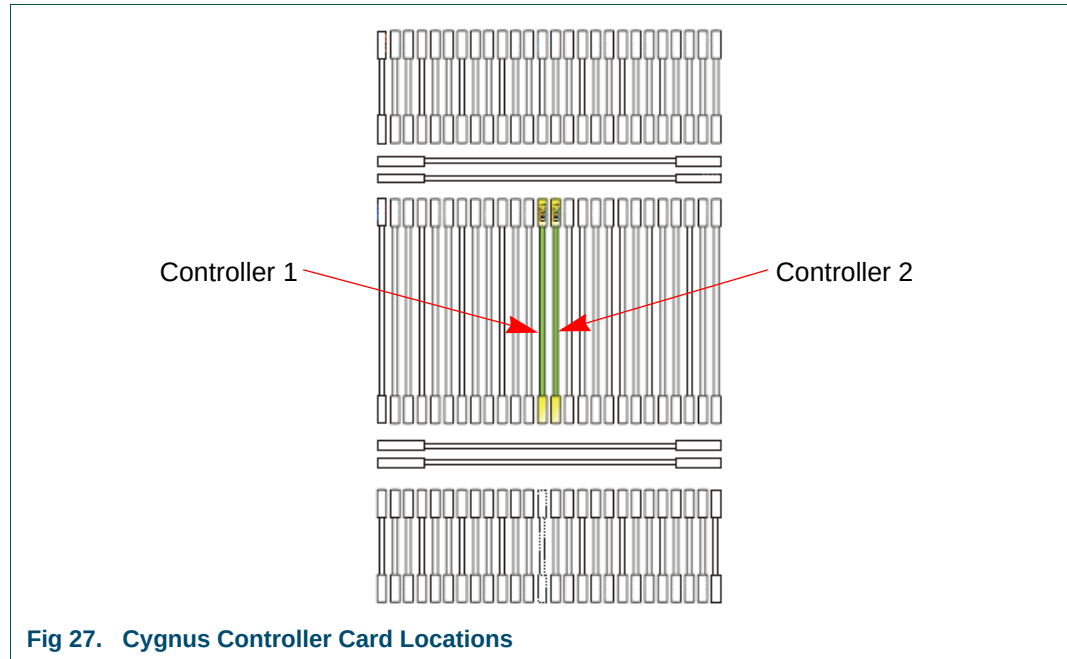


Fig 27. Cygnus Controller Card Locations

The Nebula or Nucleus router controller card plugs into the 1280 carrier card which is then plugged into the Cygnus router (see Fig 27. for location).

Note:

The 1280 card also provides the 12 V power for the cooling fans; it is therefore important that at least one of these cards is always fitted.

4.3 Controlling Cygnus

Cygnus routers are supplied with a built-in router control system (Nebula or Nucleus), meaning that control panels and Under Monitor Displays can be directly connected to the router. Any router control system requires a database of configuration details, such as the number of logical levels, signal types and control panel functions. This database can be edited using either Nebula Editor or Workbench depending on which router controller is installed. See section 5. for Nebula or section 6. for Nucleus.

The Cygnus monitoring output can be controlled using a hardware panel connected directly to the Cygnus router or remotely through an Aurora controller.

4.4 Dual Redundant Controller Operation

Since the Cygnus control module not only holds the database, but is also the channel of communication with the routing switcher, its failure would render the system inoperable. When dual control modules are fitted, a fully redundant control system is available, where changeover is both transparent and immediate.

Note:

- When two router controllers are fitted in the router they must both be the same type. For example: either 2 x Nebula or 2 x Nucleus controllers should be fitted.
- When two Nebula control modules are fitted in a Cygnus router, one must be designated 'Master' and the other as 'Slave', using switches on the module. See sections 5.4 and 5.6.1.

In a dual control system one module will always be 'Active' while the other is 'Idle'. In the event of the 'Active' controller failing, the 'Idle' controller will take over control of the frame and become 'Active'.

On power up, the Nebula control module designated Master will become 'Active'. If Nucleus controllers are fitted Controller 1 will be "Active" at power up.

Every main loop, the software checks whether a changeover has occurred. When a controller changes state from 'Idle' to 'Active', a message is issued to the remote control ports, such that any external system, such as Aurora, will be able to report the change.

All data is synchronised constantly between the dual router controllers. This data includes the current routing, tally table, configuration and the database.

Note:

When using Nucleus controllers database changes are not automatically synchronized between controllers so the user must manually push any database changes to both controllers using Workbench.

This ensures that in the event of a controller changeover no crosspoints change and all configuration parameters remain the same. Since all control ports and reference signals connect only to the active controller, using tri-state drivers, a controller changeover will be transparent to the user.

A controller changeover may be forced by the user by either pressing the Reset button on the active controller or by removing the active controller.

4.4.1 Nebula Only

In the event of a second Nebula controller, configured as a slave, being plugged into a single controller system, all data is automatically transferred from the active controller.

Important:

Do not press the reset button on the Active Nebula control module after plugging in the Idle controller as it takes several minutes to transfer the database. If the reset button is pressed during this time ALL DATABASE SETTINGS WILL BE LOST.

Both the Master and Slave Nebula controllers have an RS232 configuration port but only the port associated with the Active controller is active. The RS232 port for the Idle controller will always be disabled. If the user needs to load or edit a system database, they must connect the Nebula Editor to the active port, any attempted connection to the idle controller will fail.

4.5 System Database

In order to use the built-in router control system or control Cygnus from another control system, such as Aurora, the user must configure the control system appropriately. Any router control system requires a database of configuration details, such as the number of logical levels, signal types and control panel functions. The router controller has an initial 'Fixed' (Default) control database embedded in it's program code. When using a Nebula controller this must be replaced with a configured database.

Note: A fixed Nebula database will not work for a Cygnus router.

A configured database must be used for Cygnus and this will be created and loaded during system test. If necessary, the user can edit the details in this database using Nebula Editor for Nebula based routers or Workbench for Nucleus based routers. Refer to the Nebula or Workbench user manual as appropriate.

4.5.1 Nebula Fixed Database RS485 Port Configuration

Table 11. shows the RS485 port configuration options available when using the Nebula controller with a Fixed (Default) database. See "2444 Configuration Switches" on page 39 for the location of switch SW3.

SW3-7 - OFF = Fixed Database

Router Port	Nebula Fixed Database Port Configuration	
	SW3-8 General - OFF	SW3-8 Panels - ON
RS485 Serial Control 1	General Switcher (SW-P-02)	Multi Drop Communications Protocol (SW-P-06)
RS485 Serial Control 2	General Switcher (SW-P-02)	Multi Drop Communications Protocol (SW-P-06)
RS485 Serial Control 3	Not used	Not used
RS485 Serial Control 4	Not used	Not used

Table 11. Router Controller RS485 Port Configurations

4.5.2 Nucleus Default Database RS485 Port Configuration

Table 12. shows the configuration of the RS485 ports when using the Nucleus controller with a Default database.

Router Port/Centra COM Port	Nucleus Default Database Port Configuration
RS485 Serial Control 1 Centra COM 3	General Switcher (SW-P-02)
RS485 Serial Control 2 Centra COM 4	General Switcher (SW-P-02)
RS485 Serial Control 3 Centra COM 5	Multi Drop Communications Protocol (SW-P-06)
RS485 Serial Control 4 Centra COM 6	General Switcher (SW-P-02)

Table 12. Router Controller RS485 Port Configurations

4.6 Control Protocols

The control protocols on the RS485 ports are configured in the system database. Protocols available are as follows:

- General Switcher Protocol (SW-P-02)
- Multi-drop Communications Protocol (SW-P-06)
- General Remote Control Protocol (SW-P-08)
- Simple Switcher Protocol (SW-P-03)

Up to two RS485 ports can be configured for Nebula controllers (see section 5.7 for ports) and up to four for Nucleus controllers (see section 6.7 for ports).

4.6.1 General Switcher Protocol (SW-P-02)

General Switcher Communication Protocol is the preferred method of controlling Snell routers. It uses numbers in the range 0 to 1023 to set, acknowledge and poll crosspoints via a single router control module. Cygnus ports must be configured for this protocol if the router is to be controlled by an Aurora control system

Although labeled 'RS485', this port is actually software configured to be point to point, as with RS422, when using this protocol.

The full specification for this protocol is available from the Snell web site:

<http://www.snellgroup.com/support/customer-support>

4.6.2 General Remote Control Protocol (SW-P-08)

This protocol has been developed to provide a common method of interfacing Snell router control systems to a variety of standard and custom applications. An example of the use of this protocol would be the interfacing of the Cygnus system to a Morpheus Control & Monitoring Soft Panel control system, or to a TSL Under Monitor Display system. General Remote protocol allows the controlling system to access and control all system parameters, using the database configured names, as well as level, source and destination numbers.

The full specification for this protocol is available from the Snell web site:

<http://www.snellgroup.com/support/customer-support>

4.6.3 Multi-Drop Communications Protocol (SW-P-06)

This protocol is designed to communicate between a Snell router control system and router control panels and Under Monitor Displays. Up to sixteen 'devices' may be 'daisy-chained' onto one multi-drop control port, each device requires a unique address, identified using a rotary HEX switch. The control system database must hold configuration data for all devices. Nebula see section 5.9 and Nucleus see section 6.7.1.

The full specification for this protocol is available from the Snell web site:

<http://www.snellgroup.com/support/customer-support>

4.6.4 Simple Switcher Protocol (SW-P-03)

Similar to General Switcher Protocol but with reduced capability, such as only being able to address 128 destinations. Has the advantage of being able to set more crosspoints per video frame than General Switcher. The port may also be configured for baud rates up to 230 kbaud.

The full specification for this protocol is available from the Snell web site:

<http://www.snellgroup.com/support/customer-support>

4.7 SNMP Terminology

SNMP is a complex subject and cannot be fully described within this manual. The following is a summary of terms that may be encountered:

Manager and Agent

The terms 'client' and 'server' tend not to be used when discussing SNMP. Instead, the terms 'Manager' and 'Agent' are used. The agent is the device being managed, normally some sort of network infrastructure such as a router or hub. The manager is the software that is using SNMP to communicate with agents. The reason that the terms 'client' and 'server' are not appropriate is that these terms imply a central server supplying services to a number of clients. With SNMP normally one manager is used to manage a number of agents, although it is perfectly possible for an agent to be connected to more than one manager at once.

MIB

SNMP is a 'variable-based' protocol. An agent provides an interface comprising a number of variables, these can be scalar variables (a single value, for example 'SysLocation' a string describing the physical location of the device) or tables, which are lists of structured records, like database tables. Each device will want to provide data that is structured in accordance with the type of the device. The structure of the information provided via SNMP for a particular device is called a "management information base2" or MIB. In the case of SNMP the MIB is stored in a file – wherein the structure of the information is described using a language called ASN.1.

MIB2

Although a specific type of device will have a MIB that is particular to its function there are some variables that are deemed to be common to all devices managed by SNMP. These variables are stored in the 'MIB2' branch of the overall MIB tree. All SNMP managed devices are supposed to support these variables.

OID

Variables within a MIB are identified with an OID, or 'OBJECT_IDENTIFIER'. This is a long sequence of numbers, separated by dots. These numbers are globally unique and are managed by the IANA on behalf of the IETF. In practice the IANA does not approve every OID, but assigns an OID to an organization, which then becomes a 'branch' of the global namespace.

The Snell OID is 1.3.6.1.4.1.6419.1

The OID for the Cygnus router is 1.3.6.1.4.1.6419.1.1.1

PDU

PDU stands for 'Protocol Data Unit' and is a UDP packet conforming to SNMP format specifications sent between manager and agent. There are four basic PDU types: GET, GETNEXT, SET and TRAP. For example, to retrieve a variable from an agent, a manager sends a GET PDU then waits for a GET response from the agent. Similarly with GETNEXT (which retrieves the 'next' variable in the MIB from the one asked for) and SET.

TRAP

A manager initiates GET, GETNEXT and SET transactions, by sending an appropriate PDU. A TRAP, on the other hand, is sent unsolicited by the Agent. The manager does not have to respond to a TRAP. TRAPs are intended to allow an agent to inform a manager that something requires attention. It is then up to the manager to decide what action to take. A TRAP can include variable bindings, but it doesn't normally include a lot of data – normally it is sufficient to indicate to the manager what has changed, so the manager can then use a GET to retrieve the information.

4.8 Nebula Controller

For specific details of the Nebula router controller see section 5.

4.9 Nucleus Controller

For specific details of the Nucleus router controller see section 6.

5. Nebula Controller

When the Cygnus router is supplied with a Nebula control system up to 32 control panels (16 per RS485 port) can be connected directly to the router. It can also be configured to be remotely controlled using a serial or Ethernet interface. The Ethernet interface is only available when using the 2449 card and is not available when using the 2448 card.

See “Router Controllers” on page 29 for general router control information.

5.1 Control Card 1280/2448/2449/2444

The 2444 Nebula control card is fitted as a sub-board to a 2448 (no Ethernet) or 2449 (Ethernet) card, and the entire assembly plugs onto the 1280 carrier card.

Note: The 1280 card also provides the 12V power for the cooling fans; it is therefore important that at least one of these cards is always fitted.

For full redundancy, 2 control cards can be fitted into Cygnus. The cards will then function in ‘auto-failover’ mode in the event of a processor failure, or card removal. See “Dual Redundant Controller Operation” on page 32.

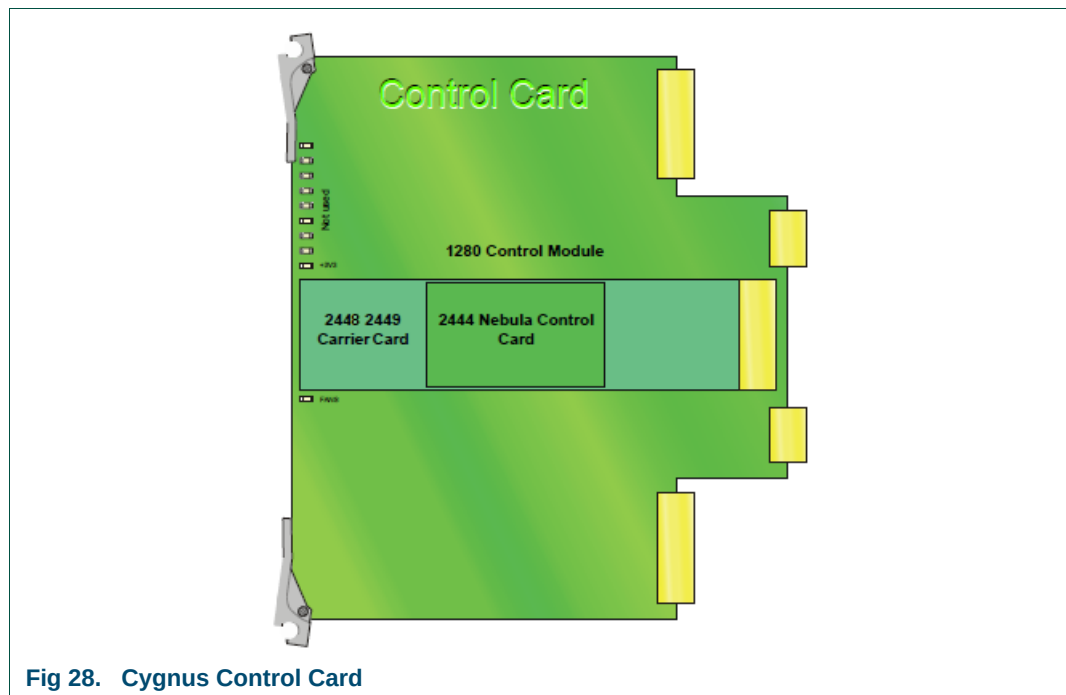


Fig 28. Cygnus Control Card

The Nebula control card has a number of switches for configuring the control system, which are detailed in the section 5.4.

5.1.1 Control Module Functions

The 2444 control card is fundamental to the operation of the Cygnus routing system. It is a microprocessor based module with non-volatile FRAM memory (NVRAM). The system code is contained in flash memory, allowing rapid boot-up and easy code upgrades. The NVRAM holds a record of the system crosspoint settings (known as the ‘tally table’), ensuring that the router status is maintained following power interruptions or signal card removal. It also holds an exact record of the router crosspoint hardware, known as the ‘configuration’, which allows the control card to check that all crosspoints are present following a reset or power down. Finally, the system database is also held in this memory.

The control module connects to all router crosspoint cards using a parallel control bus, this is used to detect card presence and for setting crosspoints. Input and output cards are detected by the control module using a serial bus, while PSUs and fan modules connect to the controller via logic lines, which pass all status data.

All external communication is passed through the control module, whether it is for remote control of the router, or for the connection of control panels and Under Monitor Displays. Finally, the control module detects reference signals, both audio and video, and determines at what point to make a crosspoint switch, in the absence of valid reference signals a 'crash' switch will be implemented.

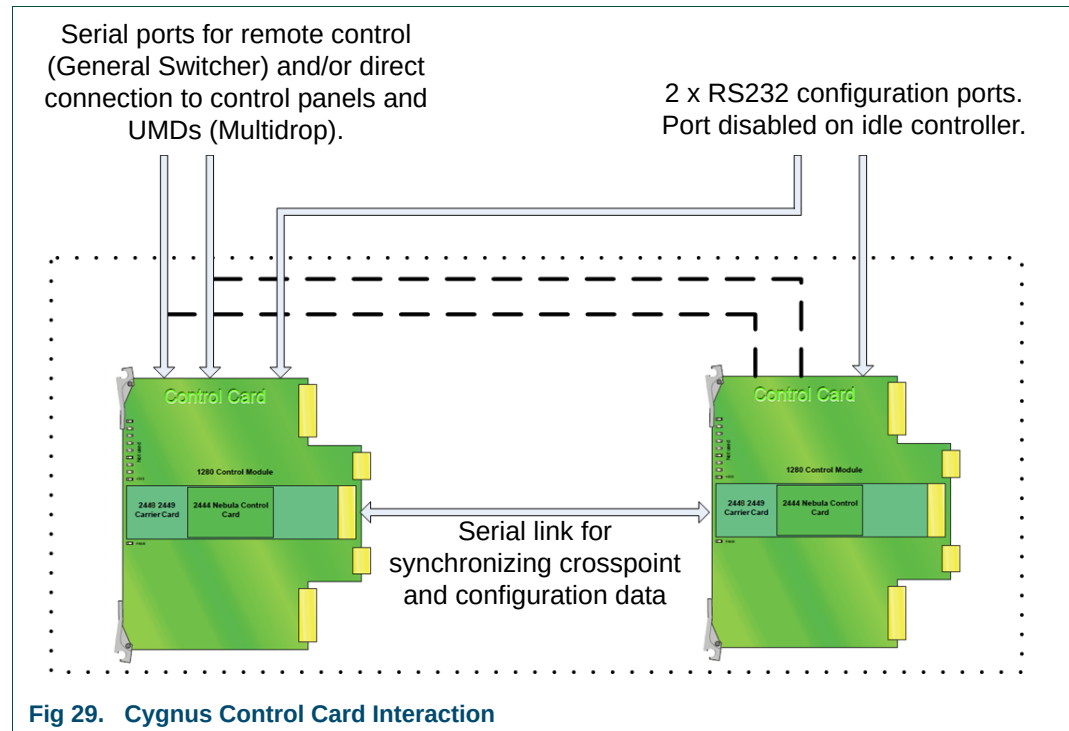
The control module has configuration switches which determine the operation of the system, details of these switches are given in section 5.4.

5.2 Nebula Controller and Editor Version Numbers

In order to accommodate the increased size of the Cygnus router, the Nebula control card, and the Nebula Editor have been upgraded. The Nebula Controller and Editor are now known as 'Version 3'. Only this version of Editor and Controller software will function with Cygnus. The simple way of ensuring that the Editor is the correct version is to run the editor and click on the Snell icon or Select 'about' under the configuration drop down. It should show Nebula Editor Version 3.x.x.xx.

5.3 System Diagram

The following diagram summarizes the interconnection of control modules within the Cygnus router:



5.4 2444 Configuration Switches

The 2444 Nebula card is fitted as a sub-module on either the Cygnus 2448 or 2449 control card. The card has configuration switches that determine the operation of the system; details of these switches are as follows.

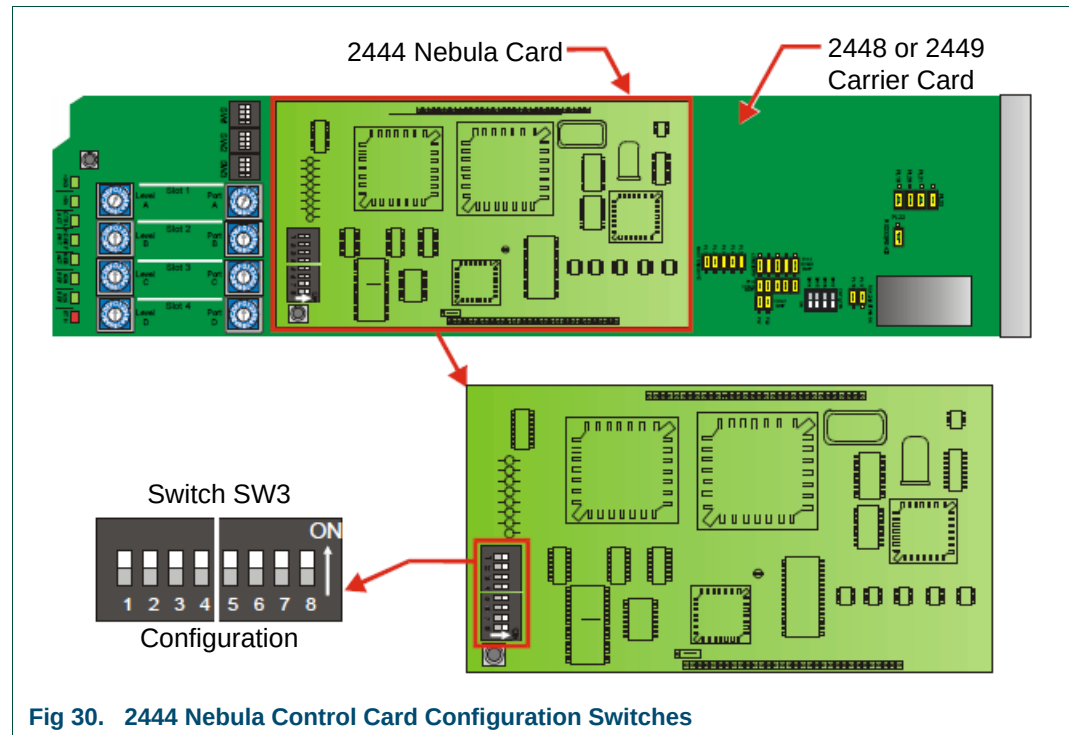


Fig 30. 2444 Nebula Control Card Configuration Switches

These switches are basic to the operation of the control system, it is therefore important that reference is made to Table 13. before the system is used.

Switch	Function	Switch SW3		Setting for Cygnus
		OFF	ON	
1	MASTER/SLAVE SELECT	SLAVE	MASTER	ON - MASTER OFF - SLAVE
2	μP CLOCK SELECT	10 MHz	20 MHz	ON - 20 MHz
3	SYSTEM RUN MODE	NORMAL	TEST	OFF - NORMAL
4	RS232 PORT BAUD RATE	9600	38400	ON - 38400
5	DEFAULT TRIGGER SELECT	625	525	Not used
6	RE-CONFIGURE	MANUAL	AUTO	ON - AUTO
7	DATABASE TYPE	FIXED	CONFIGURE	ON - CONFIGURE OFF - FIXED
8	CONTROL MODE	GENERAL	PANELS	ON - PANELS OFF - GENERAL

Table 13. Switch SW3 Switch Positions

5.4.1 Switch Descriptions

SW1 - Master/Slave select is used, in dual control situations, to assign Master/Slave status to the 2444 control modules. One module would be set to MASTER and the other to SLAVE so that on reset or power up the Master 2444 powers up first and, hence, always becomes the active controller.

SW2 - μ P clock select is used to select between 10 MHz and 20MHz uP clock frequency, the lower rate is only used for debugging purposes.

SW3 - System Run Mode determines which mode of operation the Cygnus powers up in (i.e. NORMAL or TEST). NORMAL is the standard mode of operation. TEST selects a special test mode where various features of the 2444 hardware can be tested by Snell.

SW4 - RS232 port BAUD rate select. This port is used by the Windows database editor which runs on a PC using it's COM port. The editor software will automatically detect the BAUD rate configured, and therefore this rate only needs changing to 9600 BAUD if the PC being used has difficulty communicating at 38400 BAUD.

SW5 - Default trigger select is used to select between 625 or 525 reference to be assigned to each source for the fixed databases. Not used by Cygnus.

SW6 - Reconfigure selects between AUTOMATIC reconfigure of cards in the system on power-up or reset and MANUAL, in which the system configuration is compared to that held in non-volatile memory. It is recommended that during initial configuration the switch be set to AUTO, and when the final desired configuration is achieved, the switch changed to MANUAL. In this way the control card will always look for the intended system card configuration, and if cards or slave systems appear after the initial power-up, they will not be de-configured from the system.

SW7 - Database Type selects whether to use the fixed, non-editable database or the editable one. Cygnus uses configure.

SW8 - Control mode is used in conjunction with SW7, which must be set to Fixed, to select which protocol the serial control ports will use. 'GENERAL' configures both RS485 ports to support General Switcher protocol. 'PANELS' configures both RS485 Remote ports to support Multi-drop Communications protocol. See section 4.6 for a description of these protocols.

Not used by Cygnus.

5.4.2 2444 Diagnostic LEDS

The 8 yellow diagnostic LEDS on the 2444 have the following definitions:

LED	Function
1	Power-on
2	Reset
3	Control Card Active
4	Flashing at 2 Hz - Active Controller
5	Crosspoint set - Flashes when set
6	No-handshake from a module
7	525 Reference input detected
8	625 Reference input detected
4 & 8	4 On and 8 Flashing - R/W error with RAM
4 & 7	4 On and 7 Flashing - Checksum error in EPROM

Table 14. 2444 Diagnostic LEDS

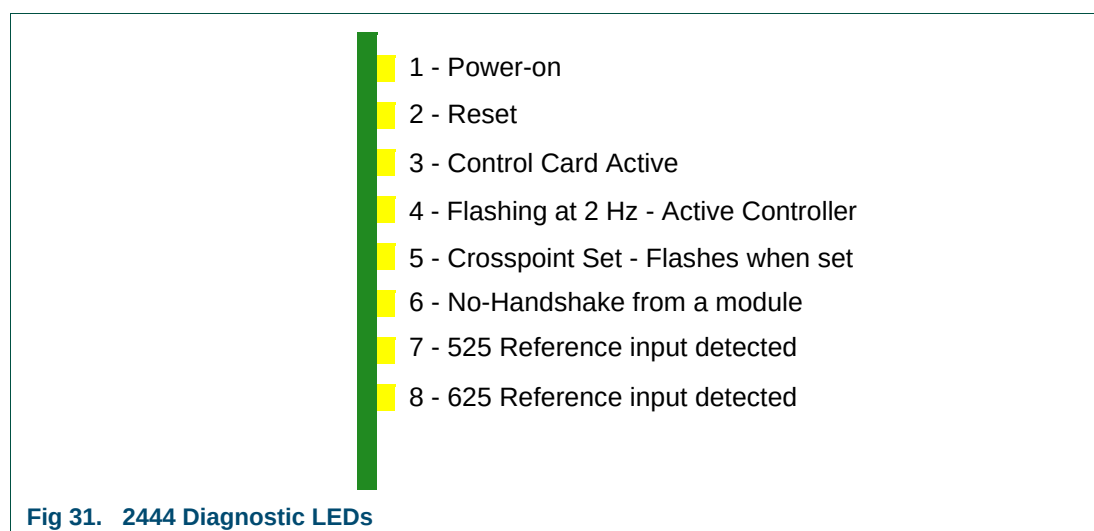


Fig 31. 2444 Diagnostic LEDS

5.5 Using the Reset Buttons

The 2448 and 2449 carrier cards have a reset button on the front edge, which performs exactly the same function as the reset button on the 2444 sub board, which is not normally accessible. This reset will cause the processor to reboot, a process that takes only a few seconds, it will NOT lose the system database or change any crosspoint settings. The control card may be safely 'hot plugged', which performs the same function as a reset.

5.6 2448/2449 Configuration Switches

The 2448 and 2449 carrier cards have a number of configuration switches that are critical to the operation of the system. The switches on these modules are as follows:

- 4 jumpers for setting the Master/Slave mode in a dual controller system
- 4 way DIP switch for setting the mode of the RS232 port, THIS MUST BE SET TO "OFF" - 'CNTL' FOR CYGNUS
- 8 rotary HEX switches NOT SUPPORTED WITH CYGNUS. But they must be left in a default mode (see Figure 32).
- 2 jumpers for selecting between RS485 or Ethernet port operation (2448 must be set to RS485 as it has no Ethernet)
- 1 jumper to select RS232 or RS485 for the third serial port

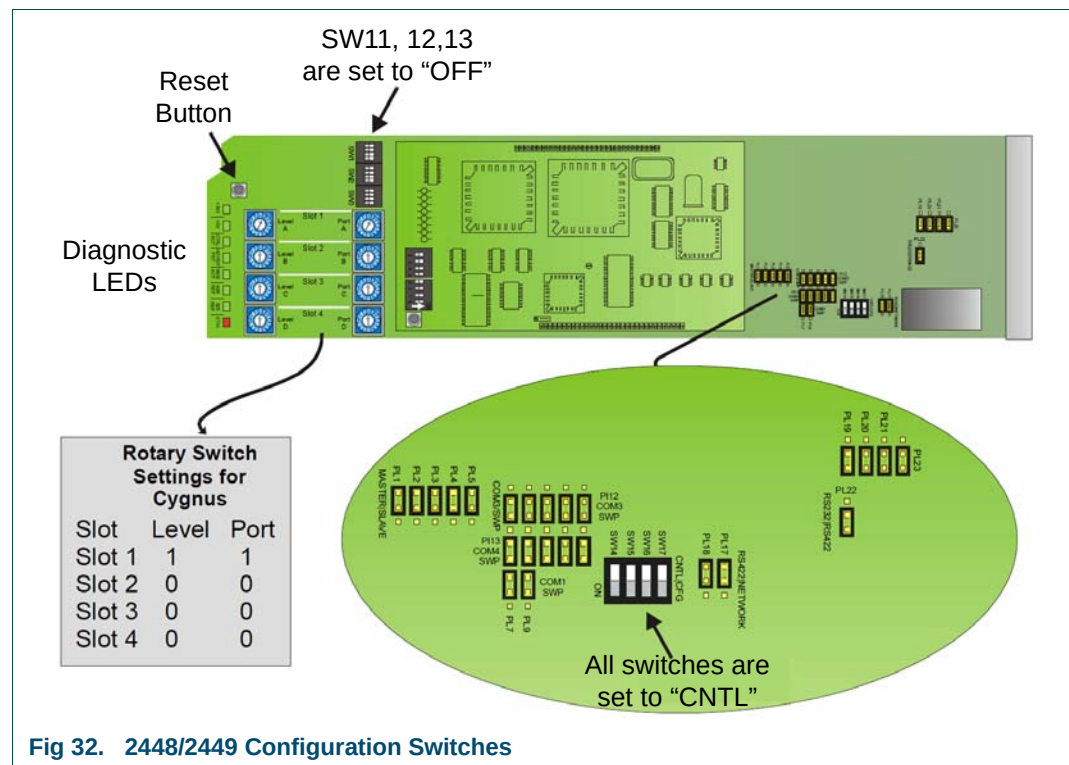


Fig 32. 2448/2449 Configuration Switches

5.6.1 Setting Master/Slave Jumpers

The five jumpers PL1 to 5 must be set correctly to match the master/slave mode.

In a dual controller system, that is, a Cygnus router with 2 Nebula controllers, one controller must be configured as 'Master' and one as 'Slave'. See section 4.4 for an explanation of a dual redundant system. These jumpers must match the mode set on the 2444 card.

In Figure 32 the jumpers are shown in Master mode.

5.6.2 Selecting Serial or Ethernet Control - 2449 Only

The 2449 card has an Ethernet port available; this may be used to control the router using General Switcher protocol over IP or SNMP. The user can select either the second RS485 port, or the Ethernet port, using jumpers PL17 and 18. See Section 5.10 for full details on configuring the Ethernet port.

Figure 32 shows the jumpers set for RS422 mode.

Note: This setting does not apply to the 2448 card as it has no Beck chip so Ethernet is not available.

5.6.3 Selecting RS232/422 for RS485 Port 3

RS485 port 3 is available only for custom protocols, implemented by Snell using an on-board processor to perform protocol translation. Under normal use this port will not be active.

5.6.4 2448/2449 Diagnostic LEDs

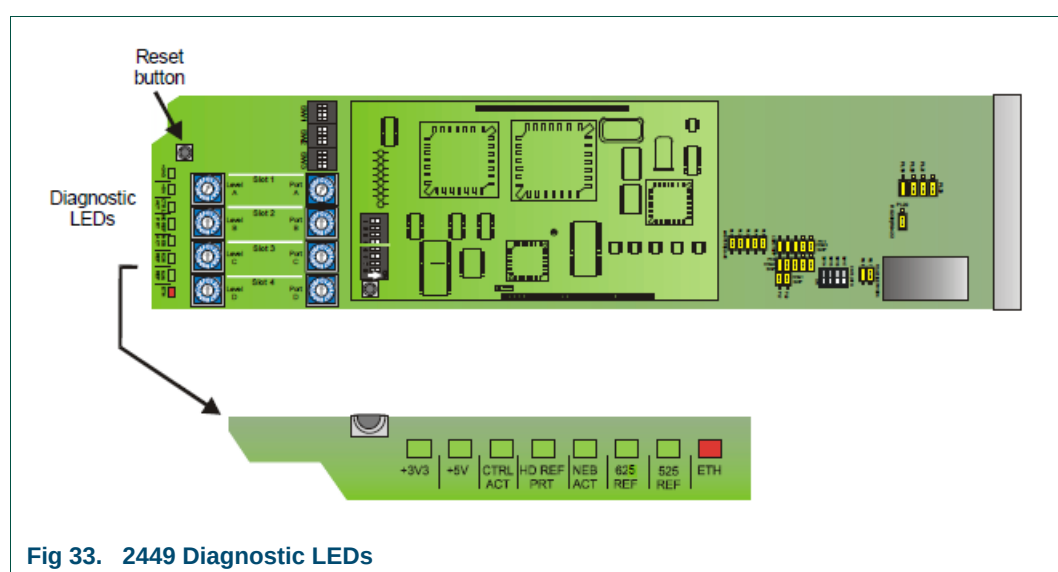


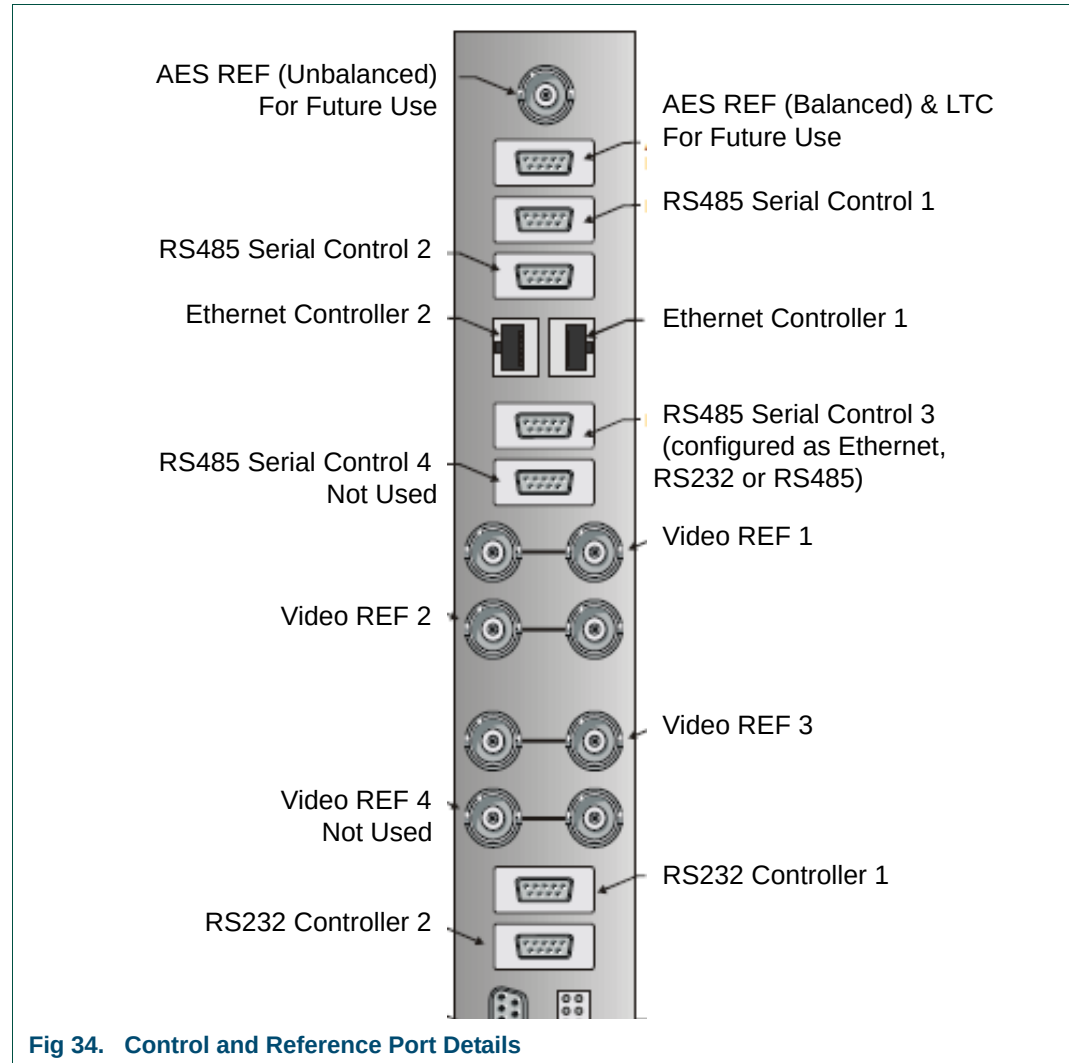
Fig 33. 2449 Diagnostic LEDs

These LEDs have the following functions:

LED Name	Color	Function	Normal Status
+3V3	Green	Power OK	Green
+5V	Green	Power OK	Green
CTRL ACT	Green	Crosspoint command	Occasional flash
HD REF PRT	Green/Red	HD Reference present	Green
NEB ACT	Green	Controller Active - Green Controller Idle - Off	Green On - Controller 1 Green Off - Controller 2
625 REF	Green/Red	625 Reference present	Green
525 REF	Green/Red	525 Reference present	Green
ETH	Red	Ethernet Active	Flash Red if Ethernet in use (Not used on 2448 card)

Table 15. 2444 Diagnostic LEDs

5.7 Control and Reference Port Details



Cygnus has Serial, Ethernet and Reference ports available on the rear connector panel as follows:

Control Ports

- RS485 ports 1 and 2 (9 pin D type), common to both Nebula controller cards but only connected to the active controller, configured by the system database
- RS485 port 3 available as an alternative to the Ethernet port, as configured by the jumper settings, which also configure this port to be RS232 or RS485. This port is intended for a customer specified control protocol implemented by Snell, and therefore by default will be inactive.
- RS485 port 4 is not currently supported
- 2 x RS232 Editor ports one for each Nebula controller card (9 pin D type) for connecting directly to a PC COM port
- 2 x Ethernet Ports (RJ45) one for each Nucleus controller card. Available as an alternative to the second RS485 port, as configured by the 2449 jumper setting. The second RS485 port must be configured for General Switcher protocol in the database for this port to function.

Reference Ports

- AES REF (Balanced) & LTC or AES REF (Unbalanced): not used in Cygnus
- VIDEO REF 1: 525 Black & Burst
- VIDEO REF 2: 625 Black & Burst
- VIDEO REF 3: HD Black & Burst or Tri-Level
- VIDEO REF 4: not used

All video references are loop-through connections. The 2449 control card will indicate if each reference has been recognized, see section 5.6.4. If no reference is present for a particular source, the system will 'crash switch'.

5.8 Connecting Reference signals

In order for Cygnus to switch between different sources in accordance with SMPTE RP168 it must have the appropriate reference signals connected (see Fig 34. for Reference ports). Also, the system database must be configured so that all sources use the same reference, or, each source is allocated the correct reference in a multi-standard system. This is where references are allocated in the Nebula Editor:

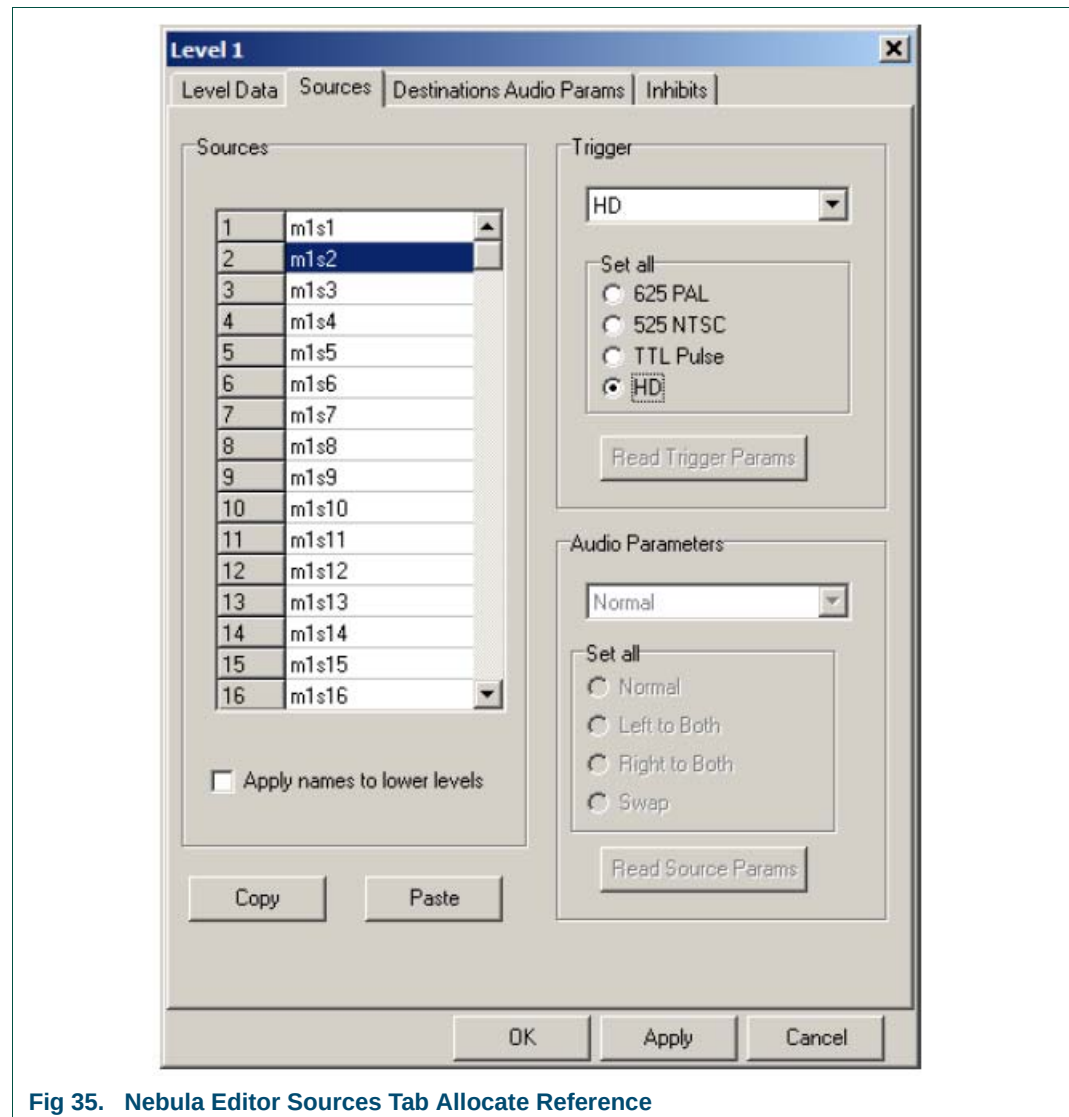


Fig 35. Nebula Editor Sources Tab Allocate Reference

5.9 RS485 Multi-Drop Communications Protocol (SW-P-06)

RS485 Serial Port 1 configured to use Multi Drop communications protocol (see section 5.4). Panel types and addresses are shown in Table 16.

RS485 Port 1 - set to Panels (SW-P-06)						
Panel Address	Panel Name	Controller	Sources	Destinations	Overrides	Levels/ Brightness
1	PNL 1-1	6276, X-Y	All	All	None	All/6
2	PNL 1-2	6276, X-Y	All	All	None	All/6
3	PNL 1-3	6276, X-Y	All	All	None	All/6
4	PNL 1-4	6277, 8 Bus	All	1 to 8, 33 to 40	None	All/6
5	PNL 1-5	6277, 8 Bus	All	9 to 16, 41 to 48	None	All/6
6	PNL 1-6	6277, 8 Bus	All	17 to 24, 49 to 56	None	All/6
7	PNL 1-7	6277, 8 Bus	All	25 to 32, 57 to 64	None	All/6
8	PNL 1-8	6285	1 to 32	1	1 to 8	All
9	PNL 1-9	6285	33 to 64	1	1 to 8	All
10	PNL 1-10	6285	1 to 32	2	1 to 8	All
11	PNL 1-11	6285	33 to 64	2	1 to 8	All
12	PNL 1-12	6285	1 to 32	3	1 to 8	All
13	PNL 1-13	6285	33 to 64	3	1 to 8	All
14	PNL 1-14	6285	1 to 32	4	1 to 8	All
15	PNL 1-15	6285	33 to 64	4	1 to 8	All
16	PNL 1-16	6285	1 to 32	1 to 32	None	All

Table 16. Port 1 Controllers and Addresses in the Nebula Database

RS485 Serial Port 2 configured to use Multi Drop communications protocol (see section 5.4). Panel types and addresses are shown in Table 17.

RS485 Port 2 - set to Panels (SW-P-06)						
Panel Address	Panel Name	Controller	Sources	Destinations	Overrides	Levels/ Brightness
1	PNL 2-1	6276, X-Y	All	All	None	All/6
2	PNL 2-2	6276, X-Y	All	All	None	All/6
3	PNL 2-3	6276, X-Y	All	All	None	All/6
4	PNL 2-4	6277, 8 Bus	All	1 to 8, 33 to 40	None	All/6
5	PNL 2-5	6277, 8 Bus	All	9 to 16, 41 to 48	None	All/6
6	PNL 2-6	6277, 8 Bus	All	17 to 24, 49 to 56	None	All/6
7	PNL 2-7	6277, 8 Bus	All	25 to 32, 57 to 64	None	All/6
8	PNL 2-8	6285	1 to 32	5	1 to 8	All
9	PNL 2-9	6285	33 to 64	5	1 to 8	All
10	PNL 2-10	6285	1 to 32	6	1 to 8	All
11	PNL 2-11	6285	33 to 64	6	1 to 8	All
12	PNL 2-12	6285	1 to 32	7	1 to 8	All
13	PNL 2-13	6285	33 to 64	7	1 to 8	All
14	PNL 2-14	6285	1 to 32	8	1 to 8	All
15	PNL 2-15	6285	33 to 64	8	1 to 8	All
16	PNL 2-16	Master 6276, XY	All	All	None	All/6

Table 17. Port 2 Controllers and Addresses in the Nebula Database

5.10 Using the Ethernet Port with the Nebula Controller - 2449 Only

Note:

This section does not apply to the 2448 card as it has no Beck chip so Ethernet is not available.

The Cygnus rear panel has two RJ45 type Ethernet connectors fitted, one for each controller. With a Nebula controller only one of these ports will ever be active, the port connected to the idle controller will be disabled. The user must ensure that the control module is correctly configured, by referring to section 5.6.2. If dual controllers are fitted, both control modules must be configured to use the Ethernet port, otherwise communication will be lost in the event of a changeover.

For the router to be controlled over Ethernet, Nebula port 2 on Cygnus must be configured for General Switcher Protocol. This is done using the Nebula Editor software; refer to the Nebula handbook for full details.

The port is configured for connecting to a 10 Base T Ethernet Hub, and when configured correctly, will allow the router to be controlled, and for status information to be requested, using Snell's General Switcher protocol over IP or SNMP.

Ethernet support for Cygnus is provided using a 'Beck' chip (SC12), which is a 80186 processor system complete with RAM, NVRAM, serial and Ethernet ports all in one package. The chip has system software and configuration files which may all be loaded and edited using a software tool supplied with the system. This tool may also be used to test the Ethernet connection, control basic router functions and view the status.

This section describes the software configuration of the Beck chip using the supplied configuration tool.

5.10.1 Connecting Cygnus to a network

A standard CAT5 patch cable may be used to connect the Cygnus active Ethernet port to a 10 Base T hub or switch. By default, the Beck chip is configured for DHCP, meaning that a DHCP Server must be present on the same network segment in order an IP address to be assigned. Without this, the Snell configuration tool must be used to manually assign an address. The Beck chip includes TELNET and FTP servers in order to support the configuration tool.

5.10.2 Using the configuration tool

The user requires a PC running the Windows NT, 2000 or XP operating system. The supplied software should be copied into a new directory, along with the 'uploads' subdirectory. The tool may then be launched directly from the 'SC12Config.exe' file, or from a shortcut to this file. Providing the Cygnus is on the same network segment, the configuration tool will search the network and show the following:

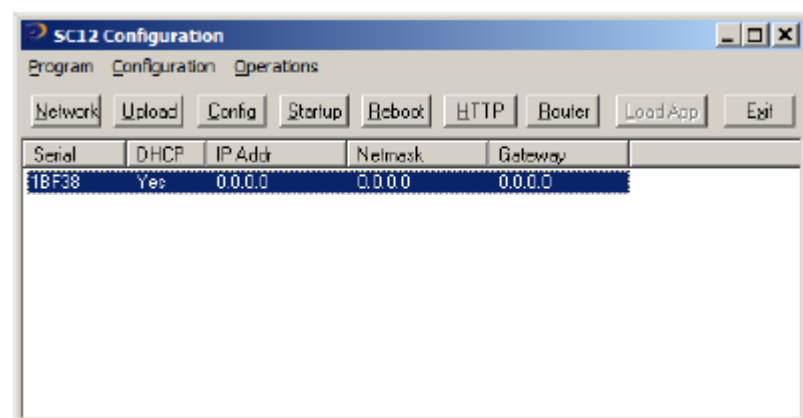


Fig 36. SC12 (Beck) Configuration Screen

The serial number will match that printed on a barcode label on the Beck chip (Figure 36).

The IP address of 1.1.1.1 means that no address has been assigned to the Beck chip, this must be done by highlighting the required device (if there are more than one), and clicking on 'Network', the following window will appear:

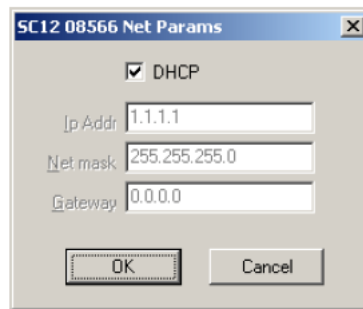


Fig 37. SC12 (Beck) Network Parameter Setting Screen

If a DHCP Server is present on the network (recommended), leave the DHCP box checked. If not, uncheck it and assign a unique IP Address.

Click OK, this will force the Beck chip to fetch an address or take the assigned one. If successful, the following will appear after a few seconds:

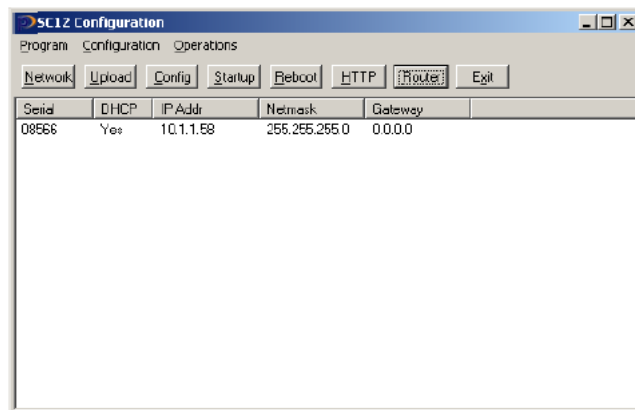


Fig 38. SC12 (Beck) Network Parameter Screen

If any problems are encountered at this stage check the application settings by selecting Program | Options from the toolbar. The login dialog will be displayed (Fig 39.):



Fig 39. SC12 (Beck) Login Screen

The passwords for 'tel' and 'ftp' are identical to the usernames

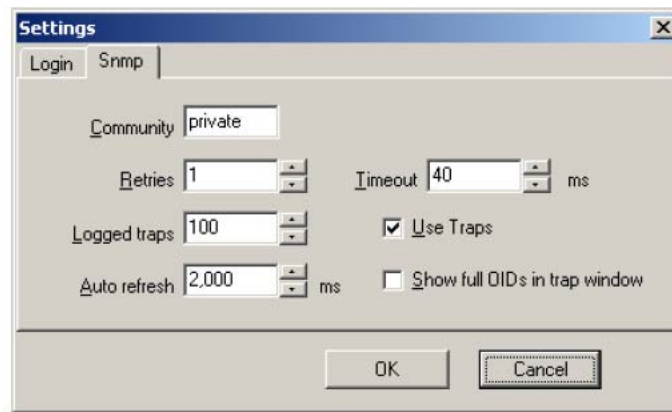


Fig 40. SC12 (Beck) SNMP Setting Screen

The user may now check what software exists on the Beck chip by clicking on 'Upload' (see Figure 38), the following will appear:

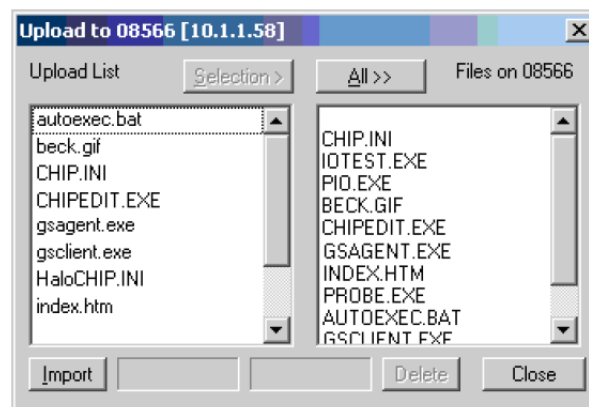


Fig 41. SC12 (Beck) Upload Screen

The right window displays the elements that already exist on the device and the left window displays the elements in the PC 'Upload' directory (Figure 41). To load all elements, click 'All', to load a selection, highlight the required element and click 'Selection'. The recommended files for loading are:

File	Details
Autoexec.bat	must contain the line 'gsagent'
Beck.gif	graphic
CHIP.INI	the configuration file for Gsagent.exe
CHIPEDIT.EXE	a tool for viewing and editing CHIP.INI
Gsagent.exe	The Cygnus SNMP agent, this is essential
Gsclient.exe	SNMP agent
Index.htm	configuration web page
Probe.exe	a debug tool, not required on production systems

Table 18. Upload Files

When complete, close the window to be returned to the configuration tool. To test the SNMP agent the PC is configured as a 'trap destination'. From the main window, click on HTTP:

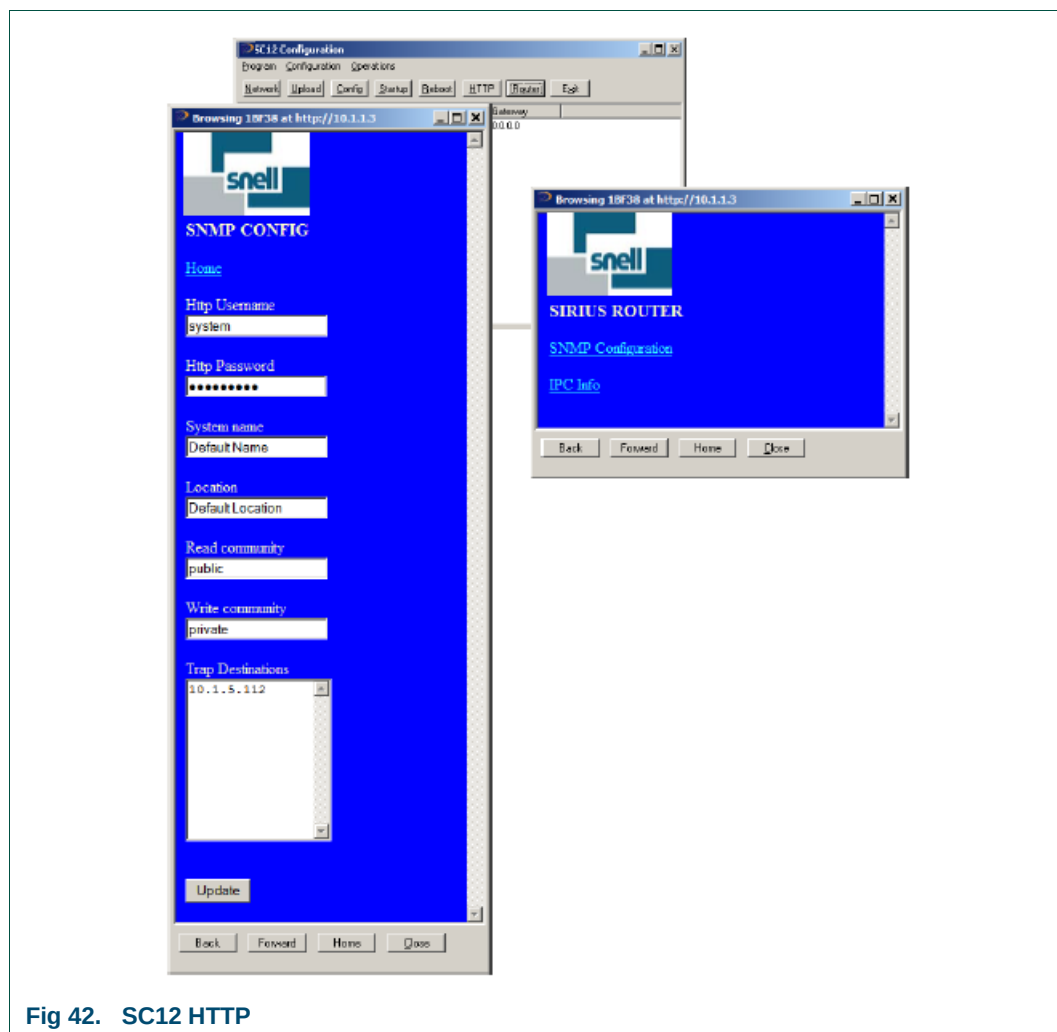


Fig 42. SC12 HTTP

1. Click on SNMP Configuration, the HTTP Username and Password are: 'System' and 'masterkey'
2. Enter the IP address of the PC you are using in the list, followed by 'update'.
3. Close the window and Reboot the chip from the configuration window.

Check the contents of the configuration file by clicking on 'Config', the file can be edited here as well, although this is not usually necessary:

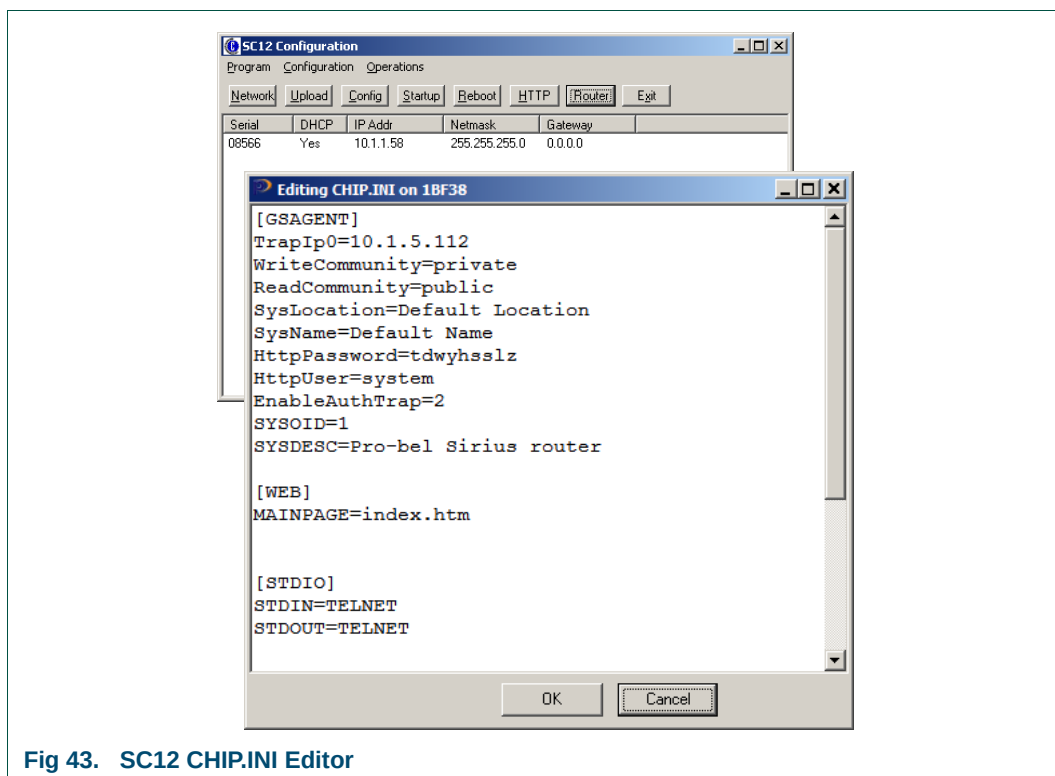


Fig 43. SC12 CHIP.INI Editor

Before the system can be tested any further, the SNMP Trap Service must be installed on the PC. This is described in section 5.11.

5.11 Installing the Windows Trap Service

5.11.1 Windows NT

To check to see if the SNMPTrap service is running under Windows NT, open the control panel then double click on the 'Services' icon.



Look for 'snmptrap' in the list of services and check to see if it is running.

Double click on Services.

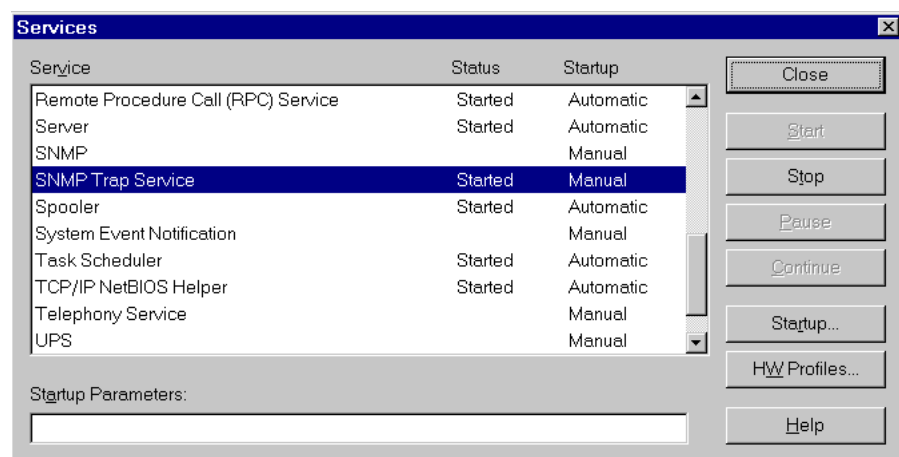


Fig 44. Windows NT Services

Check that 'SNMP trap service' is started. To install the service, use the 'Network Setup' wizard: Right click on 'Network Neighborhood', choose Properties. Select the 'Services' page, then click the 'Add' button. Select the 'SNMP service' from the list. You may need to provide your original Windows NT setup disk to complete the installation.

5.11.2 Windows 2000/XP

To see if the SNMP trap service is running, Right-click on 'My Computer' and choose 'Manage' to open the WMI console. Select 'Services and Applications', then 'Services' and see if the 'SNMP trap service' is listed on the right side of the window.

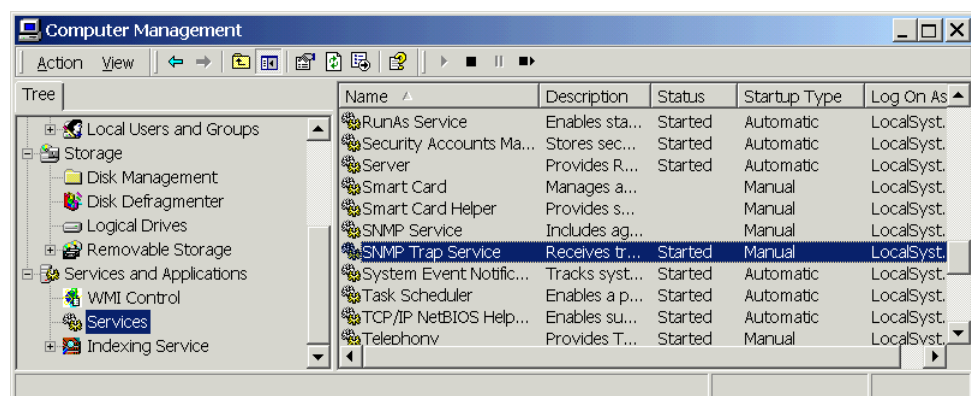


Fig 45. Windows 2000/XP Services

To install the SNMP service in Windows 2000/XP use the 'Add/Remove Windows Components' function of the 'Add/Remove programs' control panel applet. The SNMP service is listed under 'Management and Monitoring tools'.

The final step, once you have ensured that the SNMP Trap service is running, and that the IP address of your management station is listed in 'Trap Destinations' on the agent, is to enable the use of traps in the SNMP manager by checking the 'Use Traps' checkbox on the SNMP page of the Program Options dialog. (Program | Options).

5.12 Controlling the Router

1. From the main window, click on 'Router':

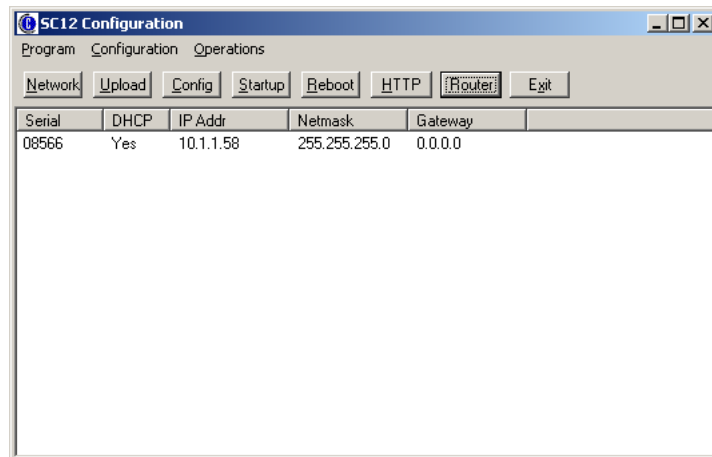


Fig 46. SC12 Configuration Screen

2. If the following window appears, you need to install and start the SNMP Trap service on your PC for full functionality. For details see section 5.11.

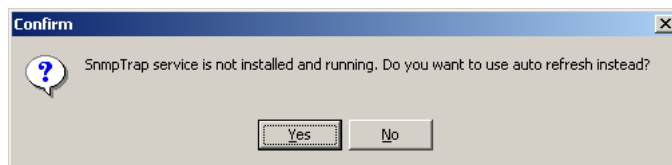


Fig 47. SNMP Not Running Dialog

3. When the following window appears, click 'Connect':

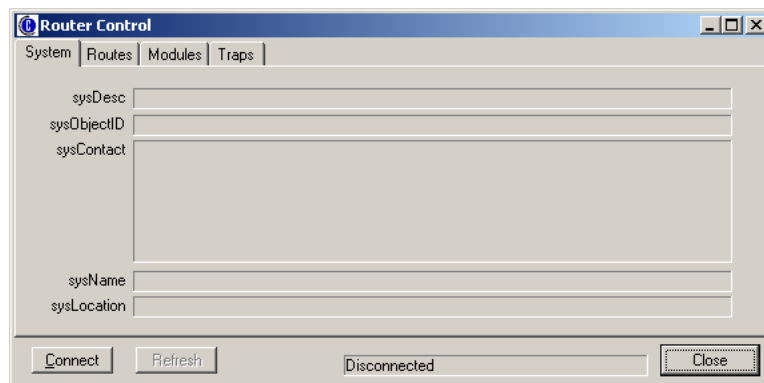


Fig 48. Router Control System Tab

4. If the connection is successful, the 'Routes' tab may be selected (Figure 49):

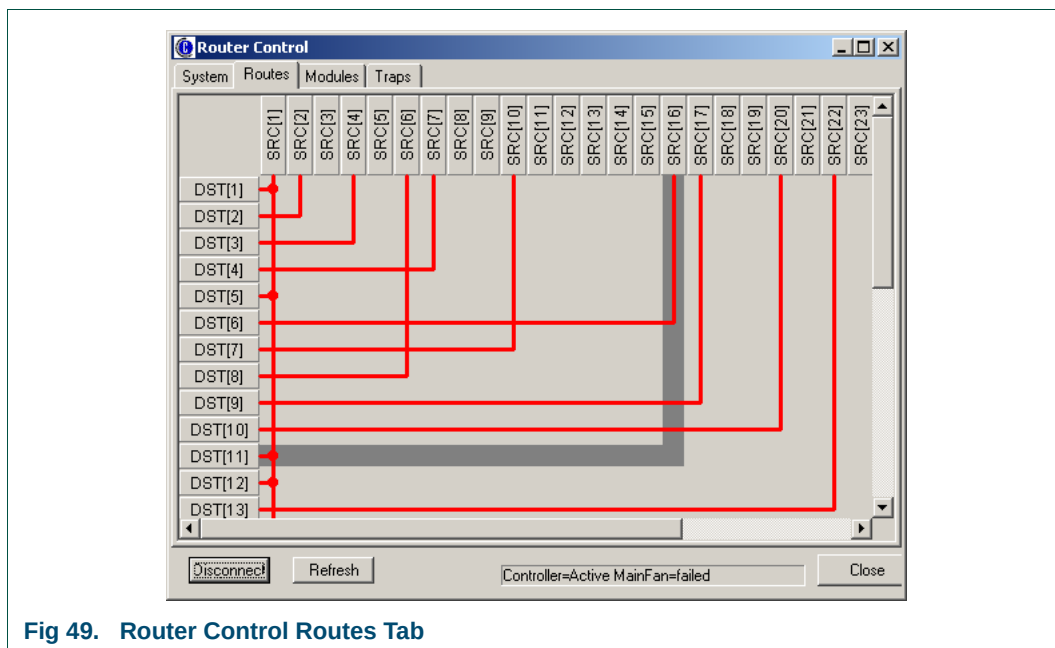


Fig 49. Router Control Routes Tab

This screen shows the route status, with a shadow representing the mouse cursor position, clicking will activate this route, which will be shown in red. This action confirms that General Switcher protocol is functioning over SNMP. The user may also check the module and PSU/fan status by selecting the 'modules' tab.

For details of SNMP see "SNMP Terminology" on page 35.

6. Nucleus Controller

When the Cygnus router is supplied with a Nucleus control system up to 64 control panels (16 per RS485 port) can be connected directly to the router. It can also be configured to be remotely controlled using a serial or Ethernet interface.

See “Router Controllers” on page 29 for general router control information.

6.1 1280 Controller Card Carrier

The Nucleus router controller card plugs into the 1280 carrier card which is then plugged into the Cygnus router (see Fig 50. for location). For full redundancy, two control cards can be fitted into the Cygnus router. The cards will then function in ‘auto-failover’ mode in the event of a processor failure, or card removal. See “Dual Redundant Controller Operation” on page 32 for details.

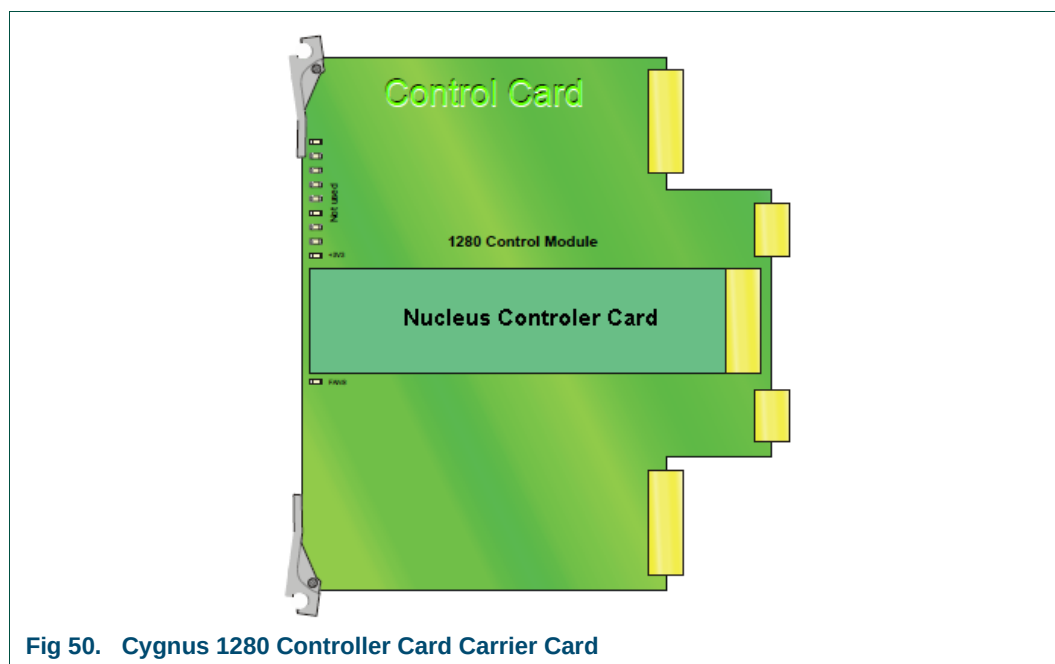


Fig 50. Cygnus 1280 Controller Card Carrier Card

Note:

The 1280 card also provides the 12 V power for the cooling fans; it is therefore important that at least one of these cards is always fitted.

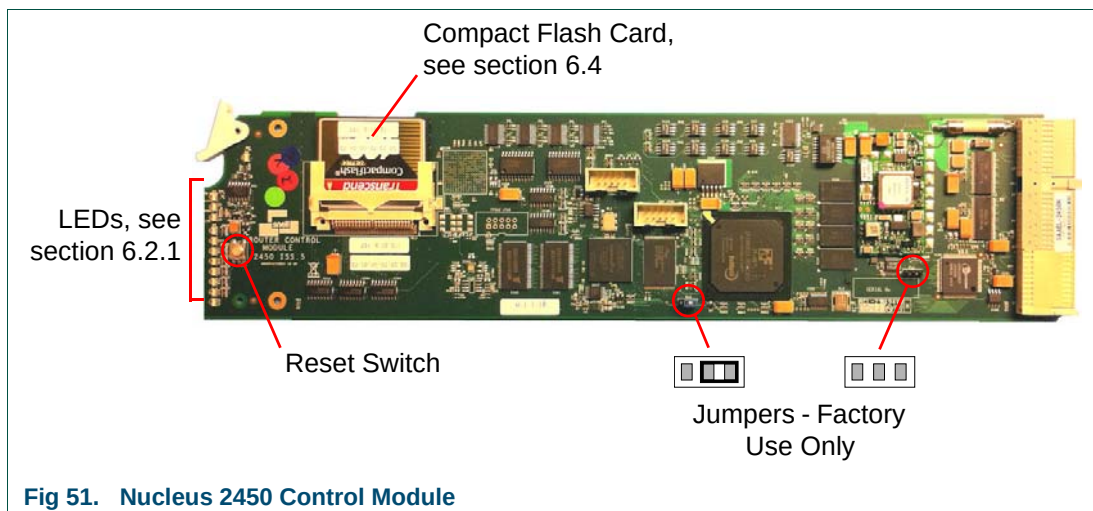
6.1.1 Cygnus 1280 Control Carrier Module LED Information

The LED color shown in bold text is the normal operating condition (if any).

LED	Illuminated Color	Detail
8 General purpose LEDs	Yellow Off	Function to be determined by control system
Module Power OK (located above control module)	Green Off	+3.3 Volt supply for module is OK +3.3 Volt supply for module has failed
Fan Power OK (located below control module)	Green Off	+12 Volt supply for fans is OK +12 Volt supply for fans has failed

Table 19. Cygnus 1280 LED Information

6.2 2450 Nucleus Router Controller Card



Refer to the Workbench manual for Nucleus Controller configuration.

Note:

1. The Nucleus controller has a default database, use Workbench's Auto Config function to match the cards in the Cygnus Router with the Workbench software database.
2. The IP address of the Nucleus controller is found in the .ini file, see section 6.6.

6.2.1 2450 Nucleus Controller LEDs

The LEDs on the Nucleus controller card are shown in Fig 52. and Table 20. lists the 2450 Nucleus controller LED functions.

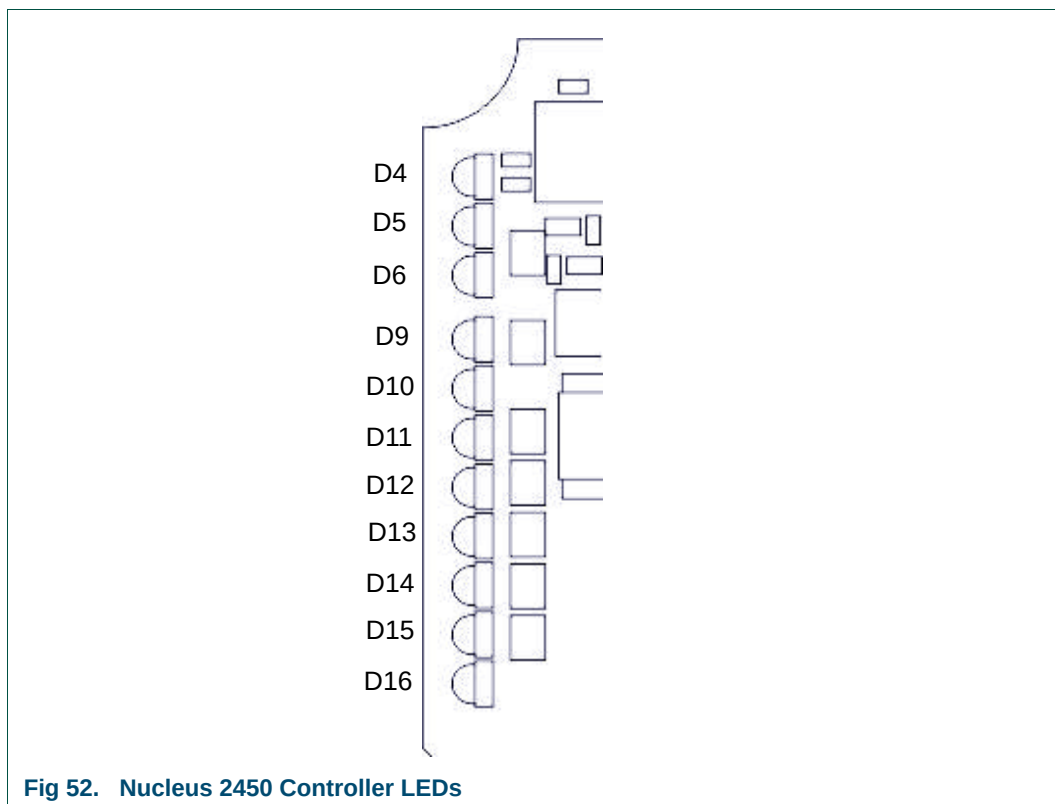


Table 20. lists the Nucleus 2450 Controller LEDs.

LED	Description
D4	Active/Idle - Blue = Active - Purple (Blue + Red) = Idle
D5	100Mb Ethernet - Green = 100 Mb (Ethernet) - Off = 10Mb Ethernet/No activity
D6	Ethernet Link Flashes = Ethernet activity
D9	Crosspoint Switch Flashes Blue = Crosspoint switched
D10	Not used
D11	Not used
D12	Not used
D13	Communications to other processor - Green = Communications to other processor - Off = No communications to other processor
D14	LTC - Flashes Blue = 625 TC present - Green = 525 TC present, - Off = TC not present
D15	When the Nucleus Controller powers up, if it detects a difference between what was configured last and the current configuration, it applies the new configuration and the D15 LED shows an FPGA validation error, see Fig 52. The next time the Nucleus Controller is rebooted there is no mismatch and therefore the D15 LED is off. If the D15 LED remains on, it could indicate a fault in the interface to the modules. An FPGA interface validation error occurs if the software detects a difference between the modules configured in the database and the configuration last written to the modules in the frame. This can happen when a reconfigure is done to recognise new cards and the Nucleus Controller is rebooted. On a dual processor system, the D15 LED can indicate a mismatch between the databases on the two controllers. - Red = FPGA interface validation error - Off = no error
D16	Active/Idle - Flashes Green = Active - Flashes Red = Idle

Table 20. Nucleus 2450 Controller LEDs

6.3 Update 2450 Nucleus Software Using FTP

If you don't know the Nucleus IP address see section 6.6 for details on finding the address.

1. Open a FTP connection to the Nucleus controller using the IP address of the Nucleus and a normal login.

User: 2450

Password: xyz

2. Copy the file **Pbl2450Controller.RTB** to the controller over the FTP connection.
3. Make sure the copy was successful and close the FTP connection.
4. Open a terminal connection to the Nucleus Controller (the TCP port is 50000). For example, use applications "HyperTerm" or "TeraTerm".
5. Login to the terminal by typing "login" followed by the password "pw2450"
6. Type the command: **Programdiskimage pbl2450controller**
7. Wait for the message **The new boot image was installed successfully.**
8. Type the command **reboot**. Alternatively the controller can be rebooted by clicking the "Force Reset of Controller" within MCM.
9. When the Nucleus controller has rebooted, the new software should be running. You can verify the version from the workbench Configuration - Nucleus software versions screen.

6.4 Update 2450 Nucleus Software Through Pbak Deploy

Pbak Deploy is a tool that is part of the Workbench installation. It makes it possible to transfer RTB files to the removable flash disk on the controller card. An RTB file is the operating system file for the Nucleus controller. The RTB file is version specific, that is, the version of RTB file must match the version of Workbench.

Important:

Whenever Workbench is upgraded, you must transfer the new RTB file to the controller.

Because other Snell products use the Pbak Deploy tool, the **Dat** and **On Time** tools are not relevant to the Cygnus Router.

To open Pbak Deploy Tool, from the Windows Start menu browse to:

Start | All Programs | Snell | Centra V3 | Utilities | Pbak Deploy Tool

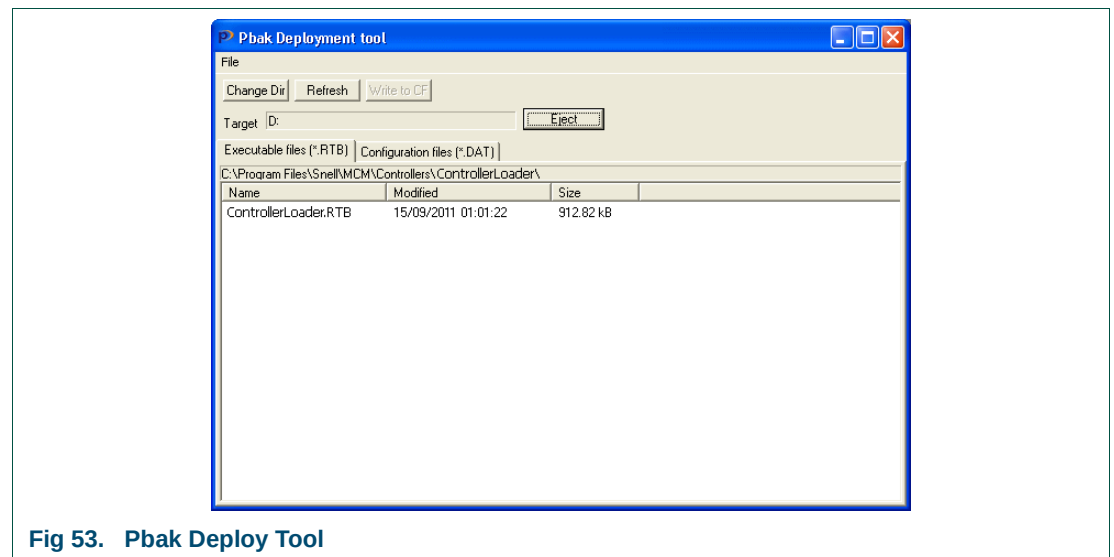


Fig 53. Pbak Deploy Tool

6.4.1 Pbak Deploy Configuration Using the Compact Flash Card

Note:

To update the Nucleus configuration through an FTP

Update the Nucleus Configuration:

1. Remove the 1280 carrier card with the **Idle** Nucleus controller, see Fig 52. for LED location:
LED D4: Idle = Purple, Active = Blue
LED D16: Idle = Red, Active = Flashing Green
2. Remove the flash card and insert it into the card reader.
3. Start Pbak Deploy and select **File | Configuration**.
4. Select the Target Drive from the drop-down list.
5. Set the **RTB directory** on your computer. If you installed to the default folders, browse to the RTB folder located in:
C:\Program Files\Snell\MCM\Controllers

Note:

The **Dat directory** and **on time tools directory** are not relevant for Cygnus Router configuration.

6. Click **OK**.

7. Select the **Pbl2450Controller.RTB** file from the list and click the **Write to CF** button.
8. Replace the flash card in the Nucleus controller, and replace the 1280 carrier card with the Nucleus controller into the Cygnus Router.
9. Wait until the card has booted: LED 15 = Red.
10. Press the **Active** Nucleus controller Reset button. The Active and Idle Nucleus controllers swap over.
11. Repeat the procedure for the second Nucleus controller. LED 15 for both Nucleus controllers are off.

6.5 Updating 2450 Nucleus Firmware

The Nucleus firmware runs on an FPGA within the Nucleus controller. This is loaded every time the controller is booted and consists of the file **PA864.rtf** on the compact flash card.

There are two methods to update the firmware:

- FTP access to the Nucleus, see section 6.5.1.
- Copying the firmware file directly to the compact flash card, see section 6.5.2.

6.5.1 Update Nucleus Firmware Using FTP

For details on connecting to the Nucleus controller using FTP see section 6.3.

1. Make a backup copy of the existing file **PA864.rtf**, either on the PC or in a folder on the compact flash card.
2. Copy the new file **PA864.rtf** onto the compact flash card.
3. Reboot the controller.

6.5.2 Update Nucleus Firmware Using the Compact Flash Card

For details on removing the compact flash card from the Nucleus controller see section 6.4.

1. Make a backup copy of the existing file **PA864.rtf**, either on the PC or in a folder on the compact flash card.
2. Copy the new file **PA864.rtf** onto the compact flash card.
3. Replace the flash card in the Nucleus controller, and replace the 1280 carrier card with the Nucleus controller into the Cygnus Router.
4. Reboot the controller.

6.6 Finding the 2450 Nucleus IP Address

The Nucleus controller IP address can be found in the .ini file on the Compact Flash card on the Nucleus controller, Fig 51. The .ini can be opened by using a text editor such as Microsoft Notepad.

1. Ensure the Nucleus Controller card to be removed is idle:

Nucleus Controller	LED Number/Color	LED Number/Color
2450	LED D4: Idle = Purple Active = Blue	LED D16: Idle = Red Active = Flashing Green

Table 21. Nucleus 2450 Active/Idle LED Status

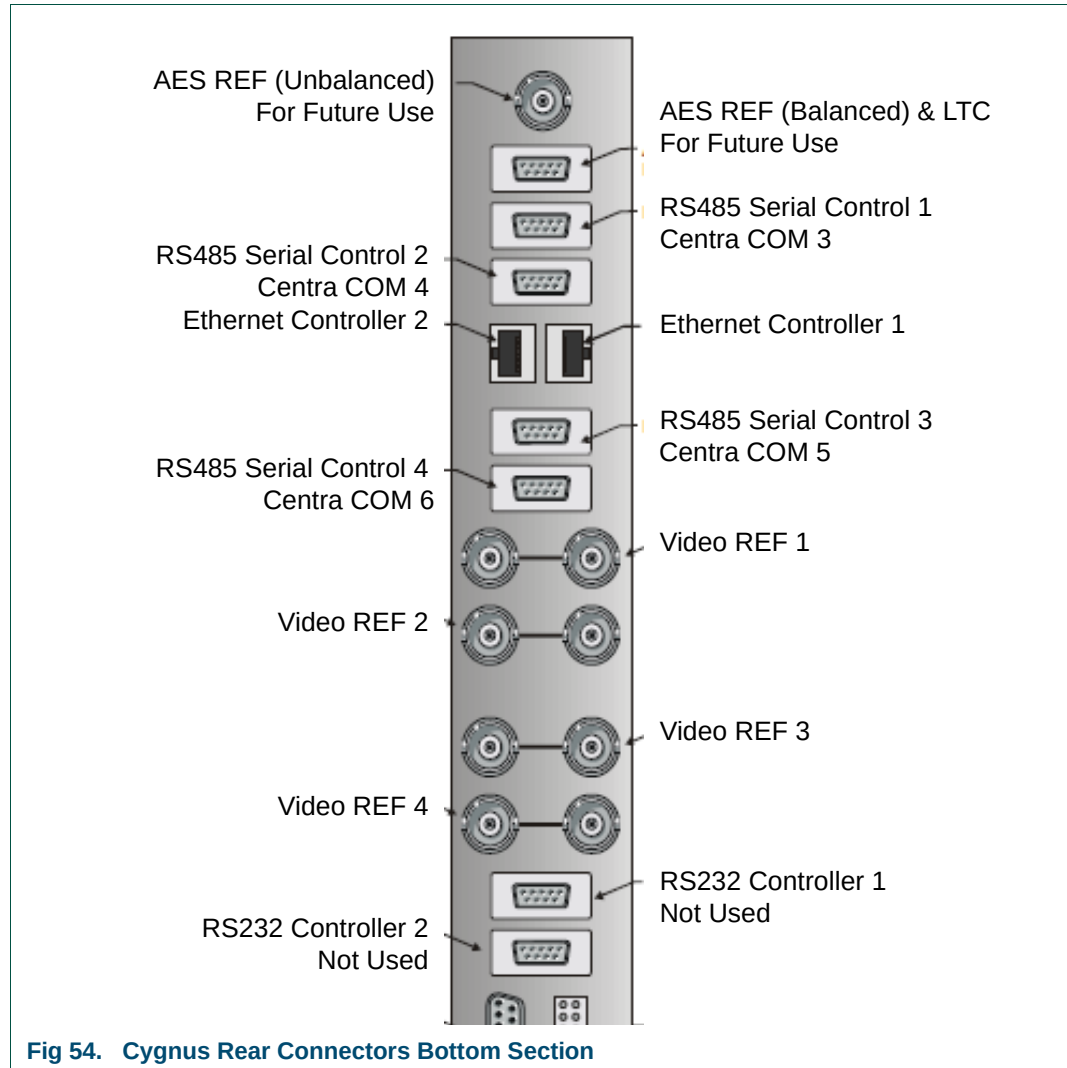
2. If the Nucleus controller to be removed is Active (see Table 21.) press the reset button on it (Fig 51.) and the Active and Idle Nucleus controllers will swap over.
3. Remove the Idle Nucleus controller card.
4. Remove the Compact Flash memory card from the Nucleus controller and insert it into a card reader.
5. Plug the card reader into your computer and view the files on the memory card.
6. Open the .ini file using a text editor such as Microsoft Notepad.
7. Make a note of the IP Address information and then close the .ini file.

Note:

If you are prompted to save changes select **No**.

8. Eject the card reader from your computer and remove the memory card.
9. Insert the memory card back in the Nucleus controller.
10. Replace the Nucleus controller in the router and it will reboot.
11. Repeat if you need the IP Address information from the other Nucleus controller.

6.7 Control and Reference Port Details



Cygnus has Serial, Ethernet and Reference Ports available on the rear connector panel as follows:

Control Ports

- 4 x RS485 Ports (9 pin D type), common to both Nucleus controllers but only connected to the active controller, configured by the system database.
 - RS485-1 - Centra COM 3
 - RS485-2 - Centra COM 4
 - RS485-3 - Centra COM 5
 - RS485-4 - Centra COM 6
- 2 x RS232 Ports - Not used with Nucleus
- 2 x Ethernet port (RJ45) one for each Nucleus controller.

Reference Ports

- AES REF (Balanced) & LTC or AES REF (Unbalanced): not used in Cygnus
- VIDEO REF 1
- VIDEO REF 2
- VIDEO REF 3
- VIDEO REF 4

Note:

1. Video Ref 1 has been configured as the primary reference source for all inputs in the Default database.
2. All video reference inputs are set to Auto in the Default database.

All video references are loop-through connections. If no reference is present for a particular source, the system will 'crash switch'.

For Nucleus configuration information see the Workbench user manual.

6.7.1 RS485 Multi-Drop Communications Protocol (SW-P-06)

RS485 Serial Port configured to use Multi Drop communications protocol. If the Default database is used this will be RS485 Port 3 (Centra COM 5). See sections 4.5.2 and 4.6 for information on the Default database and control protocols. Panel types and addresses are shown in Table 22.

Address	Controller	Sources	Destinations
1	Dial-up X-Y panel	All	All
2	Dial-up Multibus (8 Bus) panel	All	1 to 8
3	Dial-up Multibus (6 Bus) panel	All	1 to 6
4	Dial-up Multibus (4 Bus) panel	All	1 to 4
5	Dial-up Multibus (2 Bus) panel	All	1 and 2
6	16 x 1 BPX panel	1 to 16	1
7	32 x 1 BPX panel	1 to 32	2
8	48 x 1 BPX panel	1 to 48	3
9	Dual 16 x 1 BPX panel	1 to 16	1 and 2
10	16 x 4 X-Y panel	1 to 16	1 to 4
11	32 x 4 X-Y panel	1 to 32	1 to 4
12	48 x 4 X-Y panel	1 to 48	1 to 4
13	32 x 16 X-Y panel	1 to 32	1 to 16
14	24 x 12 X-Y panel	1 to 24	1 to 12
15	Not Used		
16	16 x 16 X-Y panel	1 to 16	1 to 16

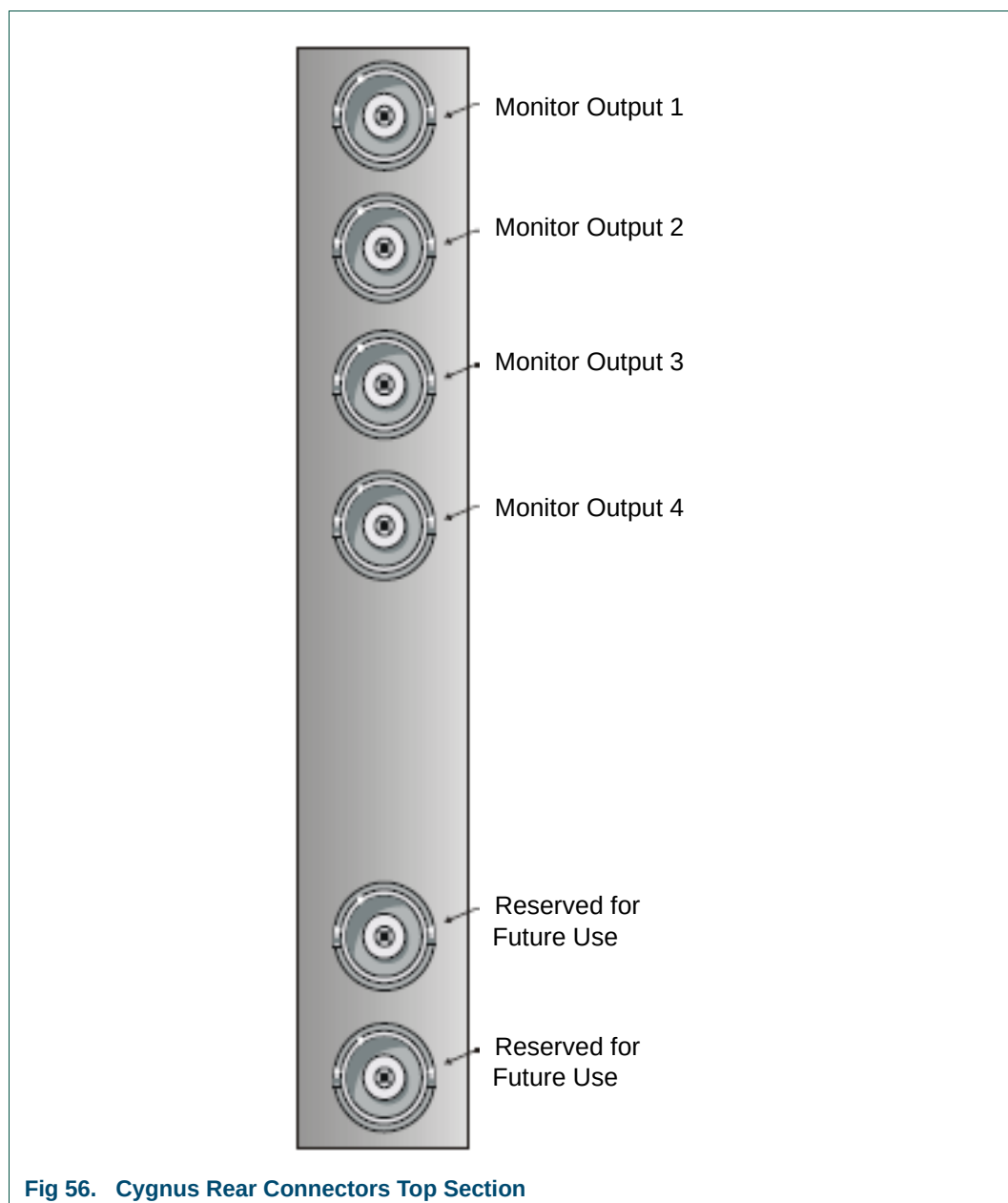
Table 22. Controllers and Addresses in the Nucleus Default Database

7. Cygnus Rear View

277	133	265	121	253	109	241	97	229	85	217	73		205	61	193	49	181	37	169	25	157	13	145	1	
278	134	266	122	254	110	242	98	230	86	218	74		206	62	194	50	182	38	170	26	158	14	146	2	
279	135	267	123	255	111	243	99	231	87	219	75		207	63	195	51	183	39	171	27	159	15	147	3	
280	136	268	124	256	112	244	100	232	88	220	76	I N D U S T R Y	208	64	196	52	184	40	172	28	160	16	148	4	
281	137	269	125	257	113	245	101	233	89	221	77		209	65	197	53	185	41	173	29	161	17	149	5	
282	138	270	126	258	114	246	102	234	90	222	78		210	66	198	54	186	42	174	30	162	18	150	6	
283	139	271	127	259	115	247	103	235	91	223	79		211	67	199	55	187	43	175	31	163	19	151	7	
284	140	272	128	260	116	248	104	236	92	224	80	I N D U S T R Y	212	68	200	56	188	44	176	32	164	20	152	8	
285	141	273	129	261	117	249	105	237	93	225	81		213	69	201	57	189	45	177	33	165	21	153	9	
286	142	274	130	262	118	250	106	238	94	226	82		214	70	202	58	190	46	178	34	166	22	154	10	
287	143	275	131	263	119	251	107	239	95	227	83		215	71	203	59	191	47	179	35	167	23	155	11	
288	144	276	132	264	120	252	108	240	96	228	84		216	72	204	60	192	48	180	36	168	24	156	12	
553	265	529	241	505	217	481	193	457	169	433	145	I N D U S T R Y	409	121	385	97	361	73	337	49	313	25	289	1	
554	266	530	242	506	218	482	194	458	170	434	146		410	122	386	98	362	74	338	50	314	26	290	2	
555	267	531	243	507	219	483	195	459	171	435	147		411	123	387	99	363	75	339	51	315	27	291	3	
556	268	532	244	508	220	484	196	460	172	436	148		412	124	388	100	364	76	340	52	316	28	292	4	
557	269	533	245	509	221	485	197	461	173	437	149	I N D U S T R Y	413	125	389	101	365	77	341	53	317	29	293	5	
558	270	534	246	510	222	486	198	462	174	438	150		414	126	390	102	366	78	342	54	318	30	294	6	
559	271	535	247	511	223	487	199	463	175	439	151		415	127	391	103	367	79	343	55	319	31	295	7	
560	272	536	248	512	224	488	200	464	176	440	152		416	128	392	104	368	80	344	56	320	32	296	8	
561	273	537	249	513	225	489	201	465	177	441	153	I N D U S T R Y	417	129	393	105	369	81	345	57	321	33	297	9	
562	274	538	250	514	226	490	202	466	178	442	154		418	130	394	106	370	82	346	58	322	34	298	10	
563	275	539	251	515	227	491	203	467	179	443	155		419	131	395	107	371	83	347	59	323	35	299	11	
564	276	540	252	516	228	492	204	468	180	444	156		420	132	396	108	372	84	348	60	324	36	300	12	
565	277	541	253	517	229	493	205	469	181	445	157	I N D U S T R Y	421	133	397	109	373	85	349	61	325	37	301	13	
566	278	542	254	518	230	494	206	470	182	446	158		422	134	398	110	374	86	350	62	326	38	302	14	
567	279	543	255	519	231	495	207	471	183	447	159		423	135	399	111	375	87	351	63	327	39	303	15	
568	280	544	256	520	232	496	208	472	184	448	160		424	136	400	112	376	88	352	64	328	40	304	16	
569	281	545	257	521	233	497	209	473	185	449	161	I N D U S T R Y	425	137	401	113	377	89	353	65	329	41	305	17	
570	282	546	258	522	234	498	210	474	186	450	162		426	138	402	114	378	90	354	66	330	42	306	18	
571	283	547	259	523	235	499	211	475	187	451	163		427	139	403	115	379	91	355	67	331	43	307	19	
572	284	548	260	524	236	500	212	476	188	452	164		428	140	404	116	380	92	356	68	332	44	308	20	
573	285	549	261	525	237	501	213	477	189	453	165	I N D U S T R Y	429	141	405	117	381	93	357	69	333	45	309	21	
574	286	550	262	526	238	502	214	478	190	454	166		430	142	406	118	382	94	358	70	334	46	310	22	
575	287	551	263	527	239	503	215	479	191	455	167		431	143	407	119	383	95	359	71	335	47	311	23	
576	288	552	264	528	240	504	216	480	192	456	168		432	144	408	120	384	96	360	72	336	48	312	24	
300	444	312	456	324	468	336	480	348	492	360	504	I N D U S T R Y	372	516	384	528	396	540	408	552	420	564	432	576	
299	443	311	455	323	467	335	479	347	491	359	503		371	515	383	527	395	539	407	551	419	563	431	575	
298	442	310	454	322	466	334	478	346	490	358	502		370	514	382	526	394	538	406	550	418	562	430	574	
297	441	309	453	321	465	333	477	345	489	357	501		369	513	381	525	393	537	405	549	417	561	429	573	
296	440	308	452	320	464	332	476	344	488	356	500	I N D U S T R Y	368	512	380	524	392	536	404	548	416	560	428	572	
295	439	307	451	319	463	331	475	343	487	355	499		367	511	379	523	391	535	403	547	415	559	427	571	
294	438	306	450	318	462	330	474	342	486	354	498		366	510	378	522	390	534	402	546	414	558	426	570	
293	437	305	449	317	461	329	473	341	485	353	497		365	509	377	521	389	533	401	545	413	557	425	569	
292	436	304	448	316	460	328	472	340	484	352	496	I N D U S T R Y	364	508	376	520	388	532	400	544	412	556	424	568	
291	435	303	447	315	459	327	471	339	483	351	495		363	507	375	519	387	531	399	543	411	555	423	567	
290	434	302	446	314	458	326	470	338	482	350	494		362	506	374	518	386	530	398	542	410	554	422	566	
289	433	301	445	313	457	325	469	337	481	349	493		361	505	373	517	385	529	397	541	409	553	421	565	

Fig 55. Cygnus Rear View of Connectors

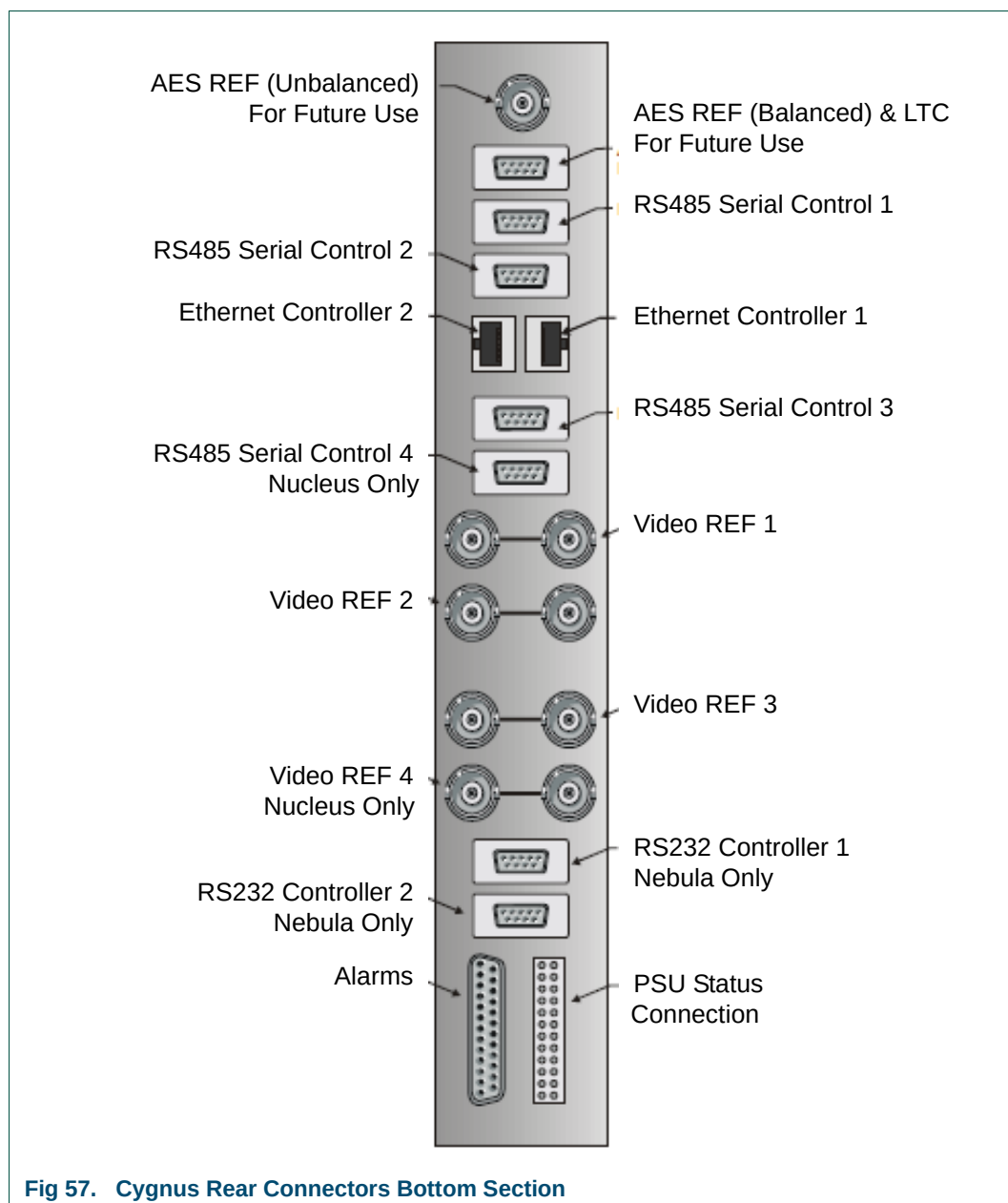
7.1 Monitoring Outputs



Monitor Output 1 is capable of monitoring any Cygnus router signal input or output. The output will be the same standard as the signal being monitored, i.e. Standard or High Definition digital video.

Note: Monitor Outputs 2, 3 and 4 are copies of Monitor Output 1.

7.2 Control, Reference and Alarm connections



All control and reference connections are described in sections 5.7 (Nebula) and 6.7 (Nucleus). Connector pin outs are detailed in section 7.3.

7.3 Connector Pin Outs

7.3.1 RS232 Serial Port - Nebula Only

This connector is configured so that it may be directly connected, pin for pin, with the COM port of a PC. 9 way 'D' type fixed sockets on frame.

RS232	
Pins	Function
1	N/C
2	Rx
3	Tx
4	N/C
5	0V
6	N/C
7	N/C
8	N/C
9	N/C

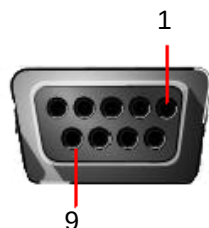


Table 23. RS232 Connector

7.3.2 RS485- Serial Ports 1 to 4

Table 24. shows the RS485 Serial port pin outs for the for Multi-drop, General Switcher and General Remote protocols.

Serial port 4 is not used by the Nebula controller.

RS485 Ports 1 to 4		
Pinout of socket when configured as:		
Pins	Multi-drop	General Switcher and General Remote Protocols
1	Chassis	Chassis
2	Rx-	Tx-
3	Tx+	Rx+
4	0V	0V
5	N/C	N/C
6	0V	0V
7	Rx+	Tx+
8	Tx-	Rx-
9	Chassis	Chassis

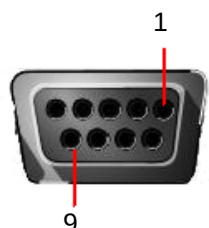


Table 24. RS485 Connector

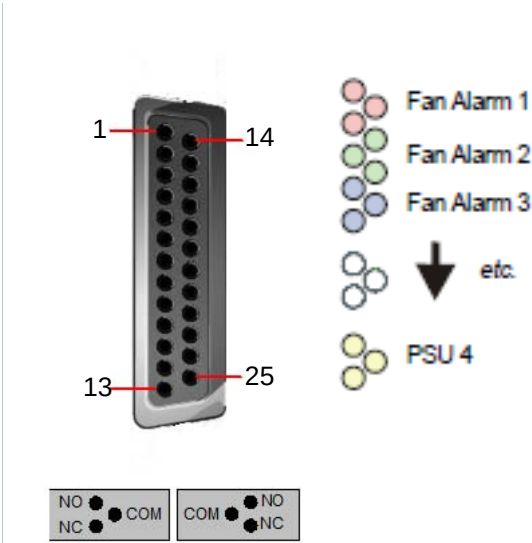
7.3.3 AES Reference and LTC

The AES and LTC input is not currently supported.

7.3.4 PSU Status

This connector is for Snell internal use only.

7.3.5 Alarms



All groups of 3 Pins
to be in this order.

Pins	Function
1	Fan 1 Normally Open
2	Fan 1 Normally Closed
3	Fan 2 Common
4	Fan 3 Normally Open
5	Fan 3 Normally Closed
6	Fan 4 Common
7	PSU 1 Normally Open
8	PSU 1 Normally Closed
9	PSU 2 Common
10	PSU 3 Normally Open
11	PSU 3Normally Closed
12	PSU 4 Common
13	Not Connected
14	Fan 1 Common
15	Fan 2 Normally Open
16	Fan 2 Normally Closed
17	Fan 3 Common
18	Fan 4 Normally Open
19	Fan 4 Normally Closed
20	PSU 1 Common
21	PSU 2 Normally Open
22	PSU 2 Normally Closed
23	PSU 3 Common
24	PSU 4 Normally Open
25	PSU 4 Normally Closed

Table 25. Alarm Relay Output Pins

8. Specification

Specifications	
General	
Power Supplies	Auto-sensing 90 to 230 Vac nominal 50/60 Hz
Power Consumption	
576 x 576 frame:	1800W max
288 x 576 frame:	1300W max
Weight	
576 x 576 Frame:	110kg max (includes 17kg PSU)
288 x 576 Frame:	95kg max (includes 17kg PSU)
PSU & Fan Monitoring	Fan and PSU failure alarms are available as relay contact closures, and as status messages over Ethernet (SNMP).
Control	
Nebula	2 x RS485, configurable as SW-P-02 (General Switcher), SW-P-08 (General Remote), or Multi-Drop protocol for connection of Snell hardware control panels. 2 x Ethernet configurable as SNMP or SW-P-02 over IP. One per controller.
Nucleus	4 x RS485, configurable as SW-P-02 (General Switcher), SW-P-08 (General Remote), or Multi-Drop protocol for connection of Snell hardware control panels. 2 x Ethernet configurable as SNMP or SW-P-02 over IP. One per controller.
Reference	
Nebula	3 x Video reference (525, 625, HD/ tri-level sync)
Nucleus	4 x Video reference (Configurable)
Mechanical	
576 x 576 Frame:	26U high includes 2U PSU shelf 19 inch rack Mounting 490mm (19 inch) deep
288 x 576 Frame:	21U high including 2U PSU shelf 19 inch rack mounting 490mm (19 inch) deep
Environmental	Cooling is fan assisted
Video Inputs & Outputs	Input equalization SD-SMPTE 259m SD Inputs > 250m (Belden 8281) HD Inputs >140m (Belden 1694) for HD and SD for signals up to 1080i 3G HD Inputs >70m (Belden 1694) for signals up to 1080p

Table 26. Specifications

